

Running Head: Feasibility of Providing Inpatient
Rehabilitation within the Naval Medical Center San Diego
Catchment Area

A FEASIBILITY STUDY ANALYZING THE POSSIBILITY OF CREATING
AN INPATIENT REHABILITATION PRODUCT LINE

A Graduate Management Project
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Abstract

This study is an analysis examining the feasibility of conducting inpatient rehabilitation at the Naval Medical Center San Diego (NMCSD). Over \$9 million was spent caring for 703 patients that used 10,322 bed days in 1999-2000. Costs increased from \$3.4 million in 1999 to \$5.6 million in 2000. A cost benefit analysis shows potential savings range from \$1-\$3.8 million per year. Milliman and Robertson criteria, when applied to NMCSD's population reveal that costs should range from \$1.8 to \$3.4 million. The literature and other data indicate that there is variability among rehabilitation patients' outcomes, and quality is not readily measured. It was concluded that NMCSD could conduct less costly inpatient rehabilitation, and increase continuity of care. This would also facilitate an increased ability to measure outcomes and quality. Although a great deal depends on the changing healthcare benefit, primarily the elimination of TRICARE Senior Prime, TRICARE beneficiaries may benefit from a small inpatient rehabilitation unit. There are also opportunities to determine if active duty readiness could be improved by having inpatient rehabilitation. The MHS should continue to evaluate all opportunities to provide services across the continuum of care.

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Feasibility Study Analyzing the Possibility of
Creating an Inpatient Rehabilitation Product Line

Chapter 1

INTRODUCTION**Background****The Military Health System Today**

The Department of Defense's Military Health System was designed to provide health care to active duty Army, Navy, Air Force and Marine Corps personnel. It has grown into an enormous enterprise that also provides care to family members, military retirees and others. In 2000, its operating budget totaled \$18.1 Billion, 6.2 percent of the Department of Defense's total budget, a two percent increase over 10 years. These funds were used to support 81 hospitals and medical centers, 489 clinics, and 310,000 personnel in the provision of health services to 8.2 million eligible beneficiaries, of which 5.8 million were users in 1999. In 1999, these beneficiaries accounted for 293,489 inpatient admissions and over 25 million-outpatient visits. (Captain John Aguilar, MC, USN, TRICARE Management

Activity, 21 February 2001). The Naval Medical Center San Diego is a major part of the MHS, which is made up of three major components. These include the Direct Care System of fixed military healthcare facilities, operational healthcare providers and facilities (mobile), and the TRICARE Network of civilian providers.

Naval Medical Center San Diego

Naval Medical Center San Diego (NMCS D), the Navy's largest military treatment facility (MTF), is located on a 79-acre property in the heart of San Diego, California. It consists of 2.5 million square feet of facilities, has a total wartime bed capacity of 539 beds, and currently operates 239 beds.

NMCS D is a tertiary care center that provides a full range of services. Staffing consists of approximately 5000 personnel including 3000 active duty military, 1200 civilian government service employees, and 800 contract personnel (Worthington, 2000). These dedicated professionals serve an average of 3698 outpatients each day and 200 inpatients, an occupancy rate of 84 percent. Every day, the Emergency Department treats over 150 patients, the Pharmacy fills 7,129 prescriptions, and Labor and Delivery facilitates the birth of 10 babies. Additionally, over 2700 meals are served to patients, staff, and visitors. Over

11,000 vehicles enter the facility each day and jockey for a position in one of the MTF's 3699 parking spaces.

In 2000, the medical center serviced a population of over 260,677 eligible beneficiaries (Managed Care Forecasting and Analysis System, 2000). These beneficiaries include active duty personnel and their family members, retirees and their family members, and others. Table 1 provides a breakdown of beneficiaries by category.

Table 1. Population by Beneficiary Category.

ACTIVE DUTY	68,935	26 Percent
ACTIVE DUTY FAMILY MEMBERS	76,666	29 Percent
RETIREEES	43,914	17 Percent
RETIREE FAMILY MEMBERS	55,912	21 Percent
OTHERS	15,250	6 Percent

These beneficiaries include retirees over the age of 65 that are considered dual eligible for both Medicare and the Department of Defense's healthcare benefits package. In addition to the 260,000 beneficiaries served by NMCSO, an additional 160,000 beneficiaries are served by the Naval Hospital Camp Pendleton located 50 miles away.

Each of the Department of Defense's military treatment facilities is assigned a "catchment area". All beneficiaries that enroll in TRICARE Prime, the Department

of Defense's Healthcare benefits program, are assigned to the MTF that is located within the catchment area that they live. Catchment areas are arranged by zip code and distance from the MTF. In order to be assigned to an MTF, beneficiaries must live within 50 miles, or one hours drive.

As a community hospital, Naval Hospital Camp Pendleton refers many of its patients to NMCS D for specialty care. Nine additional MTFs also refer patients to NMCS D for specialty care. These facilities are located in TRICARE Region Nine. They are operated by different military services that assume responsibility for the care of an additional 203,000 beneficiaries. The total beneficiary population for TRICARE region nine is 623,000 (NMCS D Directorate of Healthcare Operations, April 2001).

Naval Medical Center San Diego is the Navy's largest Graduate Medical Education activity; it offers over 75 clinical and specialty services. It also provides a Department Head Fundamentals Course, and a Clinical Investigation Program.

In 1997, NMCS D was designated as a Regional Specialized Treatment Services Facility (STSF). This dictates that all patients living within 200 miles that require specific highly specialized procedures must use

NMCSD. Currently, NMCSD is designated as an STSF for the treatment of 14 Diagnostic Related Groups (DRG). Diagnosis Related Groups are a classification scheme that categorizes patients who are medically related according to diagnosis, surgical procedure, age, sex, and the presence or absence of specific co-morbidity or complications and who are statistically similar in their inpatient length of stay (Meisenheimer, 1997). Naval Medical Center San Diego's STSF-DRGs are for high cost procedures that are considerably more expensive to conduct at civilian facilities (Directorate for Healthcare Operations, NMCSD). Therefore, all beneficiaries, with the exception of a few that can not come to NMCSD for various reasons, must come to NMCSD if they have an STSF-DRG.

In addition to its designation as an STSF, NMCSD's primary responsibility is to provide for the medical readiness of the Navy and Marine Corps. Therefore, 60 percent of its active duty staff is assigned to operational platforms/units that are required to deploy when called upon because of war or other crisis. These platforms include the hospital ship USNS Mercy (TAH-19), Fleet Marine Force Field Hospitals, and Casualty Receiving and Treatment Ships (CRTS), amphibious assault ships that perform secondary missions as short-term hospital ships. Personnel

assigned to these units must train regularly. This requires providers and staff to be away from the MTF for short periods every year. The result is that military providers are not available to treat patients, which makes it difficult for the military system to operate as efficiently as a civilian system. Therefore, readiness is a cost of doing business in military health care. Naval Medical Center San Diego's three primary missions include:

1. Delivering quality health services in support of the Armed Forces
2. Maintaining medical readiness, and
3. Advancing medicine through education, training, and research

Naval Medical Center San Diego's diverse mission, as well as its high volume of patients dictates the need for a complete continuum of care. Many patients require additional services after they are discharged from the hospital's inpatient facilities. These services include inpatient rehabilitation, skilled nursing, long-term care, home healthcare, and others that NMCSO does not provide (Foundation Health Federal Services, April 1998).

TRICARE

TRICARE is the Department of Defense's managed healthcare system that operates by combining the healthcare delivery systems of the Army, Navy, and Air Force with a

network of civilian providers (Worthington, 2000). TRICARE was implemented as a response to the increasing cost of civilian fee-for-service healthcare. These costs were increasing because of the challenge of maintaining medical combat readiness and simultaneously providing for the daily medical needs of military beneficiaries (Department of Defense, 1998). Eligible CHAMPUS (Civilian Health and Medical Program of the Uniformed Services) beneficiaries include spouses and children (through age 21) of active duty personnel, uniformed services retirees and their spouses and children, some former spouses, and others (Foundation Health Federal Services, Inc., April 1998). Prior to October 2000, beneficiaries over the age of 65 were not eligible for TRICARE benefits.

TRICARE consists of a triple option benefits package. The triple option provides beneficiaries with three choices, called "Prime", "Extra" and "Standard".

The TRICARE Prime option is the equivalent of an HMO package that provides for the full continuum of care for its enrollees. Beneficiaries must enroll in prime to be eligible. In exchange for lower out of pocket costs, enrollees must agree to choose a primary care manager (PCM) from a list of Prime network providers or MTF providers. Network providers agree to accept a negotiated fee to see

Prime patients. This fee is generally lower than the CHAMPUS Maximum Allowable Charge (CMAC), which the Managed Care Support Contractor (MCSC) negotiates with each provider. For example, the MCSC might negotiate with a family practice provider to pay 85 percent of CMAC per visit or procedure. In exchange, the provider hopes to benefit from an increase in the volume of services provided to MHS Beneficiaries from being listed as a Prime network provider.

Each category of beneficiary has different out of pocket costs. For instance, as of April 2001, co-payments for active duty family members have been eliminated. However, retirees under age 65 must pay an annual enrollment fee, and co-payments for each visit to a provider. Additionally, they must pay co-payments when they are admitted to civilian facilities (Foundation Health Federal Services, April 1998).

TRICARE Extra is the MHS's equivalent of a Preferred Provider Organization. This means that the beneficiary is not required to enroll in the program, and that a PCM assignment is not required. The member may seek care at any CHAMPUS-Certified provider. However, when the member uses a Prime network provider, there is a lower cost share and deductible than Standard. Additionally, all Extra users

must pay an annual deductible; the amount depends on the member's pay-grade. For example, an E-4 must pay an annual deductible of \$100 for his family, then a cost share of 15 percent of the contracted amount that the provider charges. Therefore, if the contracted amount is \$100, then the member must pay \$15 (Foundation Health Federal Services, April 1998). The highest cost for an MHS beneficiary is when he chooses the benefit package called TRICARE Standard.

Standard offers the greatest flexibility of choice for beneficiaries. This is the equivalent of an indemnity plan. However, it comes at a much higher cost. Standard beneficiaries can go to non-network providers as long as the provider is CHAMPUS Certified. They can use MTF providers on a space available basis; however, they are last on the priority list for access to appointments and care. When a beneficiary uses a contracted provider, their benefits are covered under the Extra benefit. This results in a lower cost share. However, if the member uses a non-network provider, his cost share increases. For example, active duty pays 20 percent of CMAC and Retirees pay 25 percent. The catch is that if a provider charges more than CMAC, then the member is also responsible for the additional amount. For example: The provider charges \$120

and CMAC is \$100. The active duty family member would pay 20 percent of CMAC ($.20 \times \$100 = \20) plus the additional charge of \$20 for a total cost of \$40 to the member. Costs to the member are also significantly higher for hospital admissions and other services.

TRICARE Senior Prime (TSP) is a three-year-old demonstration program that provides healthcare to retirees and their spouses over the age of 65. TSP provides the same benefit, as does TRICARE Prime. However, it is not a nationwide program, and is available at only nine selected sites of which NMCS D is one. Combined, the nine sites have approximately 26,000 enrollees. NMCS D has nearly 4800 enrolled, but only has a capacity of 4000. TSP will end in January 2002.

The Managed Care Support Contract

TRICARE is divided into 12 regions and the Managed Care Support Contract (MCSC) in Region 9 was among the first to be implemented. The five-year MCSC for Region 9 was scheduled to end on March 31, 2001. However, it has been extended beyond its original five-year period to continue through March 31, 2003 (Personal Conversation, Lead Agent Office, Region 9, March 2000) (Health Net Federal Services, Peter McLaughlin, April 2001). Region 9 is located in Southern California, which is one of the

nation's richest managed care markets. The result of this is a highly competitive market where providers must accept reduced fees in order to gain market share. According to NMCSO's Commanding Officer, who also functions as Region Nine's Lead Agent, the managed care support contract with HealthNet Federal Services is operating smoothly (Diaz, 1999).

Peter McLaughlin, Regional Director for HealthNet Federal Services states that Region 9 consists of 17 MTFs, which include one major medical center, three community hospitals, and 13 ambulatory clinics. The Region manages five Base Realignment and Closure (BRAC) sites, and works with the Lead Agent and its MTF Commanding Officers in managing 83 Resource Sharing Agreements. Resource Sharing Agreements (RSAs) are contracts that are designed to provide care that military personnel cannot. They do this by bringing contracted healthcare personnel into the direct healthcare system (the MTFs) thereby increasing capacity, maintaining the integrity of teaching programs, and saving the DOD and the MCSC money. The MCSC is projecting that the savings resulting from RSAs will exceed nearly \$35 million. To date, RSAs have facilitated the provision of 1,583,000 outpatient visits and 34,600 inpatient admissions. RSAs include over 500 contract employees

including Physicians, Nurses, and other professional and technical personnel. In addition to RSAs, HealthNet's main function is to maintain a network of civilian healthcare providers.

HealthNet Federal Service's primary responsibility as the managed care support contractor, is to provide care that the direct care system cannot. HealthNet currently has discounted fee for service contracts with 8,138 Primary Care Managers, 13,589 Specialists, and 4,843 Mental Health Providers. They also contract with Allied Health and Ancillary Service personnel, nearly 3000 pharmacies, 202 acute facilities including rehabilitation hospitals, and 76 mental health facilities. As of January 1, 2001, 194,606 (77 percent) eligible beneficiaries were enrolled in TRICARE Prime. Over 164,577 (86 percent) beneficiaries were linked to NMCS D primary care managers (PCMs), and only 30,029 were linked to civilian network PCMs. Most MTFs require their TRICARE Prime enrollees to enroll with an MTF PCM but NMCS D does not; even so over 86 percent have chosen an NMCS D PCM. This is possibly a measurement of NMCS D's ability to provide good care and service to its beneficiaries (Peter McLaughlin, Health Net, May 2001). It is important to understand that HealthNet is a critical partner because they help ensure services that NMCS D does

not provide, such as skilled nursing facilities (SNF) and acute rehabilitation facilities (ARF) are available to beneficiaries.

Effective April 1st, 2001, several changes to the DOD healthcare benefit occurred. One of these changes includes the elimination of co-payments for active duty family member beneficiaries that choose to use the civilian network of providers. Currently, most active duty family members utilize the MTF. If they continue to use the MTF after co-payments for civilian services are eliminated, then NMCS D may truly be the best provider as perceived by its customers.

TRICARE for Life legislation was passed in October 2000. This will change the benefit for those over the age of 65. The new benefit will begin on October 1, 2001. The program makes TRICARE a supplemental insurance program for retirees over the age of 65 that qualify for Medicare. This means that beneficiaries over the age of 65 will be eligible for both Medicare and TRICARE with Medicare as the primary payer. This adds nearly 1.4 million beneficiaries to TRICARE, and costs are estimated to increase by \$3-4 billion per year.

Statement of the Problem

As discussed during the introduction, many patients require additional services after they are discharged from the hospital's inpatient facilities. These services include inpatient rehabilitation, skilled nursing, long-term care, home healthcare, and others that NMCSO does not provide (HealthNet Health Federal Services, April 1998). The MHS is not responsible for the costs of these services unless the patient is enrolled in TSP or TRICARE Prime.

The TSP Demonstration Project required HCFA to reimburse MTFs for care that they provide beyond the previous quantity of care that was provided for patients over the age of 65 when they were treated on a space available basis. NMCSO has not yet received reimbursement for any of the care it has provided to the over 65 population. Additionally, TRICARE Region 9 incurred additional costs for care provided by the civilian network of institutional providers, specifically, sub acute and acute rehabilitation facilities.

Sub acute and acute rehabilitation facilities are a component of the continuum of care for patients suffering from illnesses or injuries that have resulted in significant disability. TSP beneficiaries have a higher incidence rate of chronic disabling disease than beneficiaries under the age of 65 and require more

rehabilitation services. Since the advent of TSP, NMCS D and the Lead Agent began tracking the utilization of rehabilitation services. As enrollment levels increased, costs for inpatient rehabilitation at civilian facilities have also increased. Between 1999 and 2000, the cost for inpatient acute rehabilitation and sub acute rehabilitation within the NMCS D and Naval Hospital Camp Pendleton catchment areas increased from \$3.4 million to nearly \$5.6 million. Utilization increased from 4594 bed days to 5728 bed days during the same period. The average length of stay also increased from 13.47 days to 18.24 (All Region Server-Bridge Database, 2001). The TSP population grew from 2000 enrollees in January 1998 to over 4800 in January 2001. According to NMCS D's Director of Healthcare Operations, over 800 retirees over the age of 65 have signed a waiting list to enter the TSP Program.

Care to our over 65 population has impact. According to the Center for Disease Control, people over the age of 65 are visiting healthcare providers an average of 6.97 times per year; a 33 percent increase above the rest of the population that visits a provider 4.7 times per year. These patients also consume a considerable amount of inpatient care.

Naval Medical Center San Diego and Naval Hospital Camp Pendleton sent over 700 patients to ARFs and SNFs In 1999 and 2000. One patient admitted to an acute rehabilitation facility consumed over \$144,816 in care alone. Active duty, retirees under age 65 and their family members also consume inpatient rehabilitation services. Over 420,000 beneficiaries live in the combined catchment areas of NMCS and Naval Hospital Camp Pendleton (Managed Care Forecasting and Analysis System, NMCS, 2001). The retiree population is aging which indicates that healthcare services will be consumed at a higher rate. In the past decade, skilled nursing facilities (SNF) began offering a myriad of rehabilitation services in order to increase revenues.

In 1996, skilled nursing facilities were caring for nearly 2 million Americans at an annual cost of almost \$88 billion (Sultz, Young, 1999). The federal Government paid over 34 percent of that bill. This includes expenditures by the Department of Defense, Medicare and Medicaid, and the Department of Veterans Affairs.

Currently, no database system is in place for statistically assessing the quality of care patients receive at rehabilitation facilities. However, case managers are available to monitor patients and ensure appropriate utilization. Once the patient leaves NMCS,

the primary care manager has no input into his treatment or outcomes. In essence, once the patient leaves the facility, continuity of care may be compromised. This combined with the enormous costs incurred has facilitated the need for this study.

NMCS D is active in tracking the utilization of rehabilitation services, however, it is not assessing the need for alternatives other than the status quo; referring patients to civilian institutions. One of the MHS's goals is "Optimization". Part of the optimization plan includes the reengineering of components of the MHS system into a "most effective organization". Therefore, the most effective organization must pursue models for the delivery of health services that include best business practices and analyzing the gaps that must be filled to maximize the efficiency of resources (DOD Health Affairs, TRICARE Management Activity (TMA), February 2001). According to TMA, the MHS must provide appropriate access to services, prevent cost overruns, conduct business planning and cost forecasting, and better integrate care across the MHS. In addition to the TMA, the Defense Medical Oversight Committee (DMOC) has concerns about the current system.

DMOC is concerned also with the MHS's ability to optimize its services. This includes increasing enrollment

capacity, access to care which should result in higher satisfaction rates, and recapturing costs wherever possible. DMOC also believes that the MHS must conduct better business planning and increase its capability to forecast costs. The MHS needs to "optimize" before creating a new managed care contract (TRICARE Financial Management Education Program, Basic Course, February 2001). Inpatient rehabilitation is one of the product lines that has potential for optimization. Bringing inpatient rehabilitation into NMCS D on an acute and sub acute level may prove a cost effective, best business practice that enhances efficiency and quality of care. Currently, NMCS D has no mechanism in place to measure the quality of inpatient rehabilitation provided by its contracted network institutions.

Purpose of Research

The purpose of this study is to determine the feasibility of creating an NMCS D inpatient rehabilitation facility and the best business model to pursue.

This study will examine utilization of acute and sub-acute inpatient rehabilitation by patients greater than age 65 and by those ages 17-64 to determine the cost and need for those services by both populations. The rehabilitation industry will be examined through literature review, and by

on-site analysis of a facility located in the San Diego area. A determination will be made about staffing requirements, regulatory requirements, and costs associated with civilian institutional rehabilitation. Finally, a business case analysis will be conducted to determine if an alternative approach to the provision of inpatient rehabilitation is feasible.

Literature Review

The Healthcare Industry

The healthcare industry touches the lives of every person in America at some point. Most are not even born yet when health professionals begin assessing their health. In America, the continuum of healthcare begins shortly after conception and ends when we die. This continuum includes common diagnostic care in the physician's offices to advanced medical or surgical care provided in a hospital, to the provision of end-of-life care and pain management to a dying patient at his home, a hospice, or the hospital. A myriad of services fit between those provided at the beginning and end of life.

During the 1990s, the days of stand alone hospitals that operate as a single entity virtually disappeared. Most of these individual hospitals have been engulfed by for profit and not-for-profit health care systems hoping to

capitalize on economies of scale. They do this by centralizing the administrative aspects of their business, and sticking to profitable services that are needed in their communities (Ginter, Swayne, Duncan, 1998). For example, in Nashville Tennessee, three for profit and seven not-for-profit systems were only able to sustain an average occupancy rate of 66 percent. These hospitals consolidated into two separate systems by the mid-1990s. These two networks are now in a competitive battle to increase market share. They are creating women's centers in shopping malls, and acquiring other hospitals throughout the state. One of the hospital networks, Columbia, went nationwide beginning with the acquisition of an 80 percent stake in Boston Massachusetts's MetroWest Medical Center.

The healthcare industry is currently under the influence of an increasingly hostile external environment. These influences include lower reimbursement rates by the government and other payers, an emphasis on cost containment, the high cost of new sophisticated technology, a shortage of nurses and other healthcare professionals, and increasingly stringent healthcare regulation (Ginter et al., 1998).

The California Healthcare Industry

The California Healthcare Association's Special Report, a monthly newsletter provides an eye-opening chart about the regulatory pressures that face California's hospitals. The chart titled "Who Regulates Hospitals" shows eight state agencies, and over 32 federal agencies that monitor the business of hospitals. These range from the U.S. Drug Enforcement Agency to the United States Congress and the Supreme Court (CHA, April 2001). These Agencies are charged with enforcing regulations that increase the complexity and cost of providing healthcare. Currently, the most highly penetrated managed care market in the nation besieges California's healthcare industry.

According to California's Office of Statewide Planning and Development, nearly 60 percent of California's hospitals are loosing money. Patient revenues for services provided by hospitals have declined over the past 20 years. Revenues stopped covering expenses in the early 1990s. Net marginal revenues in the year 2000 averaged a dismal negative 5.2 percent. This means that for every \$100 spent providing services, hospitals are loosing \$5.20. In order to survive, hospitals are relying on investment income and other non-medical related revenue sources to make up losses. This is in contrast to the rest of the nation's hospital industry, which has experienced a turnaround with

margins (revenues in excess of expenses) of 5.1 percent on average. In order for California's hospitals to remain solvent, revenues must exceed expenses (CHA, April 2000).

California's hospitals have been hindered by Medicare and Medicaid cutbacks, increasing utility costs, and the weight of providing indigent care to over 7.3 million uninsured. California's hospitals have been operating at a loss for over five years and now face other pressures. These include seismic safety regulations that will force many hospitals to meet new structural and non-structural regulations by 2008, and even more stringent regulations by the year 2030. Some hospitals will be forced to shut down unless the state agrees to fund some of these requirements. The total cost is estimated to be over \$24 billion because many of the hospital buildings cannot be incrementally brought into compliance (CHA, April 2000). This means they must totally rebuild. Because of these requirements and other pressures, Mission Bay Hospital, located in San Diego, shut its doors in December 2000.

The cost of utilities, specifically, electricity and natural gas has more than doubled. For one local 110-bed JCAHO accredited rehabilitation hospital, electricity costs have increased from \$20,000 per month to over \$50,000 (personal interview).

Additional cost pressures will come from the 1996 Health Insurance Portability and Accountability Act (HIPAA). This package of new regulatory guidelines requires hospitals to meet new privacy, confidentiality, reporting, and compliance requirements. The cost estimates range from \$725,000 to \$3.5 million per hospital for new information and billing systems, consulting fees, and other services (CHA, April 2001).

Payers are also creating chaos for hospitals. According to the CHA, during a recent survey of hospital accounts receivables, managed care organizations owe hospitals over \$936 million for 648,000 claims. Receivables overdue were defined as claims that have not been paid within 60 days. The report shows that 50 percent of claims are not paid within 60 days, and 27 percent are not paid within 121 days. This is creating a cash crunch for California hospitals. Employee organizations are also exerting cost pressures (CHA, August 2000).

The CHA reports that the California Nurses Association is lobbying the state legislature to enact minimum nurse staffing laws. California will be the first state to require minimum nurse (RN) staffing ratios. According to the CHA and the Association of California Nurse Leaders (ACNL) there is no definitive clinical data that correlates

quality patient care to nurse staffing. Minimum staffing ratios will prevent hospitals from deciding their own staffing needs, and create additional cost pressure (CHA, August 2000).

These increased regulations, lower reimbursement rates, high utility costs, and pressure from employee groups may result in two outcomes. First, many hospitals may be forced to declare bankruptcy and shut their doors. Second, the state and Federal Governments may increase funding to pay for the costs of meeting new regulatory requirements. As a result, healthcare costs will rise, and eventually, payers will have to foot the bill in the form of increased reimbursement to hospitals. Additionally, the health care market will continue to be competitive, and therefore, health care systems must optimize if they hope to survive.

THE REHABILITATION INDUSTRY

Industry Issues and Trends

This study discusses Acute Rehabilitation Facilities (ARFs) and Sub acute Rehabilitation Facilities. Both types of services can be provided at various types of inpatient healthcare institutions. The distinguishing feature is that each involves a certain amount of care intensity, which is measured in hours of nursing and therapy. Sub acute

rehabilitation is provided mostly in skilled nursing facilities (SNFs) and involves at least 1.5 hours of therapy per day. Acute rehabilitation involves three hours of therapy, and usually six or more hours of nursing care per day. Therefore, acute rehabilitation is more manpower intensive. Both types of services can be provided at SNFs, acute care hospitals, or stand-alone rehabilitation facilities. During the remainder of this paper sub acute rehabilitation facilities will be referred to as SNFs. This is because most sub acute rehabilitation takes place in SNFs (Personal Interview, Todd Hoff, Continental Rehabilitation Hospital, April 2001). Continental Rehabilitation Hospital is an institution located in San Diego, California. It operates as an ARF, and as a SNF. The ARF and SNF are located on separate floors. Its reimbursement levels are tied to the levels of care. Medicare covers 90 percent of its patients, and most are over age 65.

Harborside Healthcare Corporation of Boston Massachusetts operates 50 SNFs and provides a myriad of specialty services. Their profits fell by \$6.1 million between 1998 and 1999. Their profit margin fell from 20.8 percent to 12.6 percent. This is due to lower Medicare payments, which were reduced from \$369 per patient day to

\$287. Additionally, their occupancy rate fell by three percent. HCR Manor Care Corporation reported similar results. Genesis Health Ventures Corporation reports a \$3 million dollar reduction in revenues for its acute rehabilitation centers between 1998 and 1999 due to lower Medicare reimbursement rates. In 1998, the cost for various services (home care to acute care) ranged from \$40 per visit to \$1500 per inpatient day. Table 2 provides a breakdown of average costs.

Because of the new Medicare PPS (RUG-III), acute and sub acute rehabilitation companies are loosing money and many are claiming bankruptcy. Medicare provides 70-80 percent of acute rehabilitation patients, and 80-90 percent of sub acute patients. Therefore, facilities must make their losses up by charging more (cost shifting) to other payers. These payers include TRICARE.

Table 2. Average Cost of Care

Patient Setting	Unit of Service	Direct Cost	Total Cost
Acute Care	Per Day	\$600-900	\$1000-1500
Acute Rehab	Per Day	\$500-700	\$800-1200
Sub acute	Per Day	\$250-400	\$400-600
Skilled Nursing	Per Day	\$100-150	\$200-350
Day Hospital/care	Per Day	\$150-250	\$250-400

Home Care	Per Visit	\$40-90	\$70-150
Ambulatory	Per Visit	\$25-90	\$40-80

Source: *Managed Care Quarterly* (1998)

According to the National Report on Subacute Care, the Medicare Prospective Payment System is having a devastating affect on for-profit nursing home companies (National Report on Sub acute Care, June 1999).

Sheryl R. Skolnick, the managing director and senior healthcare analyst for BancBoston Roberson Stevens, in 1999, declared that the Balanced Budget Act reforms were a complete disaster for large nursing home chains. She conducted interviews with 16 Chief Executive Officers from around the country, and all of them claimed to be loosing money. According to Skolnick, the only ones making money are the small chain or individual SNF owners. They have a small span of control, and can diligently manage their business, a business that is management intensive to begin with, that now requires high levels of scrutiny to pinch every penny (National Report on Subacute Care, June 1999). During a single quarter in 1999, five of ten national companies reported losses totaling \$149.7 million. The five chains that made money had net revenues totaling \$42.5 million (National Report on Subacute Care, March 1999). In 2000, the situation for large nursing chains became worse.

"Mariner Becomes Third National SNF Chain to File Bankruptcy Protection Since Medicare PPS Implementation" is the title of an article in the National Report on Subacute Care (January 26, 2000, pp 5-7). At the end of 1999, Vencor inc., and Sun Healthcare Group Inc. also filed for Chapter 11 Bankruptcy. In addition, many SNF chains and independent SNFs have filed and nearly 7.5 percent of SNFs are operating in bankruptcy. Sun Healthcare Group lost \$227 million in 1999 compared with profits of \$230 million in 1998. According to Mariner's CEO, the crisis will continue to expand, not only because of the BBA, but also due to nursing shortages, extensive litigation costs, and other concerns. The results of BBA cuts have also had impact on patients' access to SNF Care.

According to hospital discharge planners, many SNFs are reluctant to admit patients requiring certain high-cost services, including expensive drug treatments, infusion therapy, and others indicating that reimbursement levels are possibly too low. The top reasons that SNFs refused Medicare patients were: expensive drugs, infusion therapy, ventilator care, and dialysis, wound care, decubitus ulcers, and tube feeding. On the other hand, Medicare patients that need short-term rehabilitation are readily

accepted by nursing homes; suggesting that reimbursement rates are too high for these patients.

The Government Accounting Office found during an audit that some patients are staying in acute hospitals longer before going to a SNF. Because of these problems, Medicare has already enriched payments for certain services in order to encourage SNFs to accept patients that need them. The GAO also iterated that PPS is only one factor that has contributed to the financial troubles of SNF chains. They are also hampered by high capital costs that have reduced their margins (National Report on Subacute Care, January 2000).

In the United States, during 1996, over 344,126 patients were discharged from 1,081 acute rehabilitation facilities. Two hundred and four facilities were freestanding, and 877 were operated by acute care hospitals that were exempt from the Prospective Payment System. In 1997, the number increased to 359,032 discharges from 1,123 facilities. These included 212 freestanding and 911 acute care hospitals (Carter, Relles, Wynn, Kawata, Paddock, Sood, Totton, 2000). These facilities were used to rehabilitate patients for status post hip fractures and hip replacement surgery, stroke, amputation, osteoarthritis, cardiac procedures, trauma other than spinal cord and brain

injury, Guillain-Barre, and others. These discharges included 129,399 males and 214,727 females. The majority, 296,894 were white, 35,090 were black, and 12,142 were in the "other" category. Only 27,215 were less than the age of 65. The highest use was by patients between the ages of 75-79 years old; they were responsible for 78,885 discharges (Carter, et al, 2000).

Acute Rehabilitation

Acute rehabilitation facilities, in order to receive payment from Medicare, must provide intense therapy to their patients. This includes a minimum of three hours of therapy per day. Additionally, 75 percent of all patients treated must fall into one of 10 conditions involving neurological or musculoskeletal disorders, or burns.

Prior to 1997, acute rehabilitation facilities were paid under the laws created by the Tax Equity and Fiscal Responsibility Act (TEFRA) of 1982. Payment was based on a per-case target determined by a facilities historical cost. These historical costs were then trended forward and based on a facilities actual cost per case.

In 1997, the Balanced Budget Act (BBA) included changes to the reimbursement for acute rehabilitation. The changes were intended to reduce Medicare costs. These rule changes limited the amount of money that would be paid to

rehabilitation hospitals. Currently, with the help of the Rand Corporation, HCFA is conducting studies to create a prospective payment system for ARFs. This new system will be based upon Case Mix Groups (CMGs). The Rand study uses Function Related Groups (FRGs) methodology, developed by Dr. Margaret Stinemen and others to assign typical rehabilitation cases to CMGs. This new system will be called the Institutional Rehabilitation Facility Prospective Payment System (IRF-PPS).

The new CMG codes are categorized by the impairment that is the primary reason for hospitalization called rehabilitation impairment categories (RICs). Patients are then placed into an RIC based upon their functional independence measure (FIM) data and age. The system is designed to minimize variation in costs, and is a global per diem payment mechanism similar to the Diagnostic Related Groups (DRG) system used to reimburse acute care hospitals. Under the DRG system, hospitals are paid according to a patient's diagnosis. If a patient utilizes more resources than the DRG covers, then it loses money, if the patient utilizes less, or an equal value, then it makes money or breaks even. This is one of the reasons that freestanding acute rehabilitation facilities became popular. In 1983, when Diagnostic Related Groups were

implemented, it became evident that patients needed somewhere to go for rehabilitation since acute hospitals could no longer afford to keep patients for long periods. This is because they were no longer receiving a payment for each bed day, known as a per diem payment.

After acute hospitals began to be reimbursed under the prospective payment system, the number of post acute care facilities grew dramatically. Between 1990-1997, the number of Medicare beneficiaries serviced by Home Health Agencies grew by 78 percent, SNFs 94 percent, and rehabilitation hospital discharges grew by 67 percent (Rand, 2000). Between 1990-1997, the number of rehabilitation hospitals and units located in acute hospitals rose by 4.1 percent each year (MedPAC, July 1998). By 1996, over 23 percent of all patients discharged from acute facilities used some form of post acute care and 2.8 percent were referred to a rehabilitation facility. Therefore, Medicare found it necessary to create new systems to control costs.

The new Rehabilitation PPS will also reward rehabilitation hospitals for quality. It will do this by measuring the post discharge status of patients. For instance, they will measure the number of readmissions within a period of time, the number that are transferred to long-term care, to SNFs, and the number that die. Those

that transfer the most patients to home, without subsequent readmission, will reap the most reward. In addition to rehabilitation hospitals, other business models have become popular. These include home care companies, long-term acute care facilities and low level/acuity skilled nursing facilities.

Sub acute Rehabilitation

Sub acute rehabilitation is generally provided at a skilled nursing facility or a hospital or acute rehabilitation facility that provides a SNF within its facility or in a separate building located on its campus. Sub acute rehabilitation facilities provide care to patients who do not require 3 hours of rehabilitation care per day, but at least 90 minutes of therapy per day. These facilities are reimbursed on a per diem system based on the use of resources such as nursing, physical therapy, occupational therapy and other services. This system is called RUG-III, which stands for Resource Utilization Groups. The "III" stands for the levels of rehabilitation the patient requires. Three RUG levels fit into the sub acute category, which brings a higher reimbursement level. Without going into complicated details, the three categories are Ultra High, Very High, and High. The corresponding codes are RU for Resource utilization Ultra

High, RV for Very High, and RH for High. Other SNF categories include Medium (RM), Low (RL), Extensive Service, Special Care, Clinically Complex (CC), Impaired Cognition (IC), Behavior Only (no code listed), and No Clinical Condition (PE). Reimbursement ranges from \$50.00 per day up to \$400 per day based on the RUG-III group (Healthcare Finance Agency, 2001).

Acute and Sub acute rehabilitation facilities both use a measurement system called the Functional Independence Measure (FIM). This system was developed by Margaret Stineman and her colleagues for use in the Function Related Groups system. The FIM measures 18 variables that cover the domains of self-care, sphincter control, mobility, locomotion, communication, and cognitive ability (Stineman, Hamilton, et al., 1994). These measures were found to be good predictors of resource use (Carter, Relles, et al. 1997). FIMs are therefore used to determine the proper acuity level in which to place a patient. The higher the FIM score the lower the acuity level. For instance, a patient that has all zeros and ones on a scale of one to six might require acute rehabilitation, while a patient with mostly threes and above might require the services of a sub acute SNF.

Quality Review

Determining the quality of patient care provided by acute and sub acute rehabilitation facilities is difficult. In the early 1990s, quality became a priority issue in healthcare. The Joint Commission on Accreditation of Healthcare Organizations (JCAHO) made quality a major item on its agenda by creating a ten-step model intended to assist in evaluating and monitoring the application of continuous quality improvement concepts in healthcare organizations (Meisenheimer, 1997).

In 1984, Deming suggested that gains in quality attract new users of services and products while simultaneously improving productivity and effectiveness. This translates into lower costs for producing a higher quality product. In this study, quality involves the outcomes produced from physical rehabilitation and nursing care. Today, the healthcare industry is continuing to focus on outcomes. The Department of Health and Human Services (DHHS) began developing instruments to evaluate the patient's need for post acute hospital care in 1992. Additionally, DHHS created a minimum data set to establish uniform nursing standards for collecting essential nursing data. The data included nursing diagnosis, interventions, outcomes, and the intensity of nursing care. Other quality initiatives include the development of clinical practice

guidelines (CPGs), critical pathways, and care maps for nurses. All these tools were designed to guide clinicians in providing the right care and intervention at the right time and the right setting (Meisenheimer, 1997).

These programs were also intended to reduce practice variation and improve overall outcomes. However, because of the proprietary nature of business, many providers and institutions do not share the CPGs and other tools that they research and design in order to maintain a competitive edge (Meisenheimer, 1997). Therefore, every institution must individually create its own CPGs, which takes time and resources. The result is that much variation still exists. The key is that processes or systems of care are critical to quality and cost outcomes.

"Quality effectiveness must focus on the effectiveness of the team in improving outcomes" (Meisenheimer, 1997). Currently, JCAHO evaluates the care of patients during their surveys. They look to see if there is a multi-disciplinary treatment plan that includes:

- Anticipation of patient's unique needs according to age, the severity of disease, and impairment or disability
- Goals for care, treatment, and rehabilitation

- Care provided in an interdisciplinary collaborative manner

This indicates that institutions should take a team approach to providing care. The team should include physicians, nurses, pharmacists, physical therapists, case managers, social workers, and any others that might be involved in a specific patients care and rehabilitation (Command Leadership Update, NMCSO, JCAHO Preparation Presentation, Captain Goff, May 18th, 2001).

In rehabilitation facilities, an interdisciplinary approach involving the same professions mentioned above are involved in the patient's rehabilitation. Currently, these facilities measure factors such as the patient's mood and behavior patterns, functional status, bladder and bowel management and medical complexity, pain status, nutritional status, and others. Many Acute Rehabilitation Hospitals are JCAHO Accredited (personal interview, Todd Hoff, CEO, Continental Rehabilitation Hospital, April 2001).

Additionally, facilities that include SNF beds must be state and Medicare certified to care for Medicare and Medicaid patients. Medicare and HCFA have proposed a new assessment instrument designed to provide a minimum data set to measure patient outcomes (www.aha.org) It is available in downloadable form at the American Hospital

Association's web site. These measures are currently used by 70 percent of rehabilitation facilities and HCFA is now adopting them in order to measure outcomes by comparing them to interventions provided, cost and outcomes. The new instrument also will be used to measure the occurrence of discharges to home, or other care settings, including readmission to acute hospitals and death (AHA Fax Update, April 2001, HCFA, Minimum Data Set-Post Acute Care (MDS-PAC)-Version 1.0 Interrupted Stay Tracking Form, July 2000). Functional Independence Measures (FIMs) are one of the primary tools available to acute rehabilitation facilities (ARFs).

Currently, each facility designs its own FIM system. These measurements are taken upon the patient's admission, during the patient's stay, and at discharge. Therefore, before and after comparisons can be made to determine if interventions such as nursing therapy, physical therapy, occupational therapy, and others improve FIMs. However, these measures are not currently routinely shared with payers other than HCFA. Current studies are attempting to predict events such as length of stay based on factors/symptoms that patients have before admission to ARFs and SNFs.

One study uses a measurement called the Berg Balance Scale to predict the average length of stay and the discharge outcome for patients that undergo rehabilitation for acute stroke. This study involving 128 patients was conducted in Ontario Canada between January 1, 1995 and March 31, 1996. The purpose was to determine the value of the Berg Balance Scale (BBS) in predicting the outcomes of length of stay and discharge status of patients that underwent treatment at a tertiary inpatient stroke rehabilitation unit (Wee, Bagg, Palepu, April 1999).

The BBS is similar to the section of the FIM, called the Motor FIM-5 sub scores. The BBS is a 56-point system that measures 14 tasks on a 0-4 scale. If the patient cannot complete a task at all, he is rated a zero (0). If the patient can complete the task independently, he is rated a four (4). The tasks include balancing on one leg, sitting with arms folded (an indicator of balance), transferring from one surface to another, reaching forward and standing, and others. The test is simple to administer using a ruler and stopwatch. Because measurement standards are objective, intra-rater and inter-rater reliability were found to be excellent at .97 and .98 respectively. The study concluded that measuring BBS scores could assist providers and case managers in determining the length of

stay, and the discharge status (home, long term care, SNF, or other setting) of patients that suffer a stroke. The study also found variables such as age, a high BBS score, and the presence of social support to be high predictors of discharge to home. Family support was the highest predictor of discharge to a private home. Only 22 percent of patients that lacked family support were discharged to their homes (Wee, Bagg, Palepu, April 1999).

In contrast, 85 percent of patients with family support were discharged home, even though many had lower BBS scores and higher disability levels when they were discharged. The conclusion: the BBS is only a moderate predictor of length of stay and discharge status. However, the BBS has the potential application for use in the acute tertiary hospital setting to help guide decisions about admissions to a rehabilitation unit and prognosis (Wee, Bagg, Palepu, April 1999). Some providers believe that the sub acute setting is just as viable an option for many patients as the acute rehabilitation setting.

In a commentary (Letter to the Editor) sent to the Journal of the American Geriatrics Society (1997, Vol. 45, 385), Dr. Tom von Sternberg, MD. Of Health Partners, Minneapolis, Minnesota, rebutted a previous study that attempted to show that the acute rehabilitation setting was

superior to the sub acute setting. The study conducted in 1996 involved patients that were treated in 1989 and 1990. Dr. Sternberg suggested that the data was old, and that sub acute care providers have improved their quality. He stated that:

"our sub acute care unit is a partnership between a mature, vertically integrated, non-profit HMO and high quality nursing home in the community that have developed, with us, specific units of sub acute care for out patients. The nurse to patient staff ratio is one registered nurse to every 8-10 patients. Physical therapy and occupational therapy take place twice a day, six days a week. We also provide geriatrics medical management with a geriatrician making rounds in the units twice a week and a geriatrics nurse practitioner seeing patients 4-5 times per week. We emphasize weekly multidisciplinary team meetings".

Dr. Sternberg continues to say that 80 percent of the patients return home within 14 days of admission and that the facility follows specific critical pathways for hip and knee replacements. He believes that the sub acute care unit matches the care

provided at acute rehabilitation units. His conclusion is that appropriate patients can be moved from the tertiary hospital directly to the sub acute setting sooner when the facility is adequately staffed. He further contends that hospital days can be traded for geriatric rehabilitation days. The result is a significant cost avoidance without sacrificing quality. However, Dr. Steinberg continues by saying that:

“There needs to be a common database for more accurate comparative analysis between facilities. To date, there has not been enough analysis of patient outcomes for those who go to various post hospital venues”.

Finally, he suggests that FIMs need to be measured at every level of patient care for those patients that suffer debilitating injuries. This means that measurement should start at the time of injury through the completion of therapy and discharge to the patient's final destination. Some studies have been inconclusive.

A study involving stroke patients attempted to determine if patients receiving therapy seven days a week would have better outcomes than those that undergo therapy

six days a week. The study involved 2,060 post stroke patients. The majority was over 65 years old. Although the study determined that organized stroke units reduce mortality and length of stay; conducting therapy seven days a week had no impact on outcomes when compared to patients that had the therapy six days per week (Ruff, Yarnell, Marinos, 1999). Another similar study directed at hip replacement and knee replacement patients had the opposite finding.

In evaluating the same length of stay outcome, Rappaport, et al., determined that patients receiving therapy seven days per week had shorter lengths of stay than those receiving therapy five days per week. The finding was that 84 patients who received therapy seven days a week had an average length of stay of 10.84 days vice 12.28 days for 53 patients that received therapy five days a week (Rappaport, Judd-Van Eard, 1989). This represents a difference of 1.44 days. This additional time represents a cost of over \$1,500 in the San Diego area. Therefore, each injury or illness must be evaluated to determine the quantity of therapy that maximizes outcomes while keeping costs reasonable.

Other studies have shown that non-patient care variables can have an impact on outcomes such as length of

stay. Monane et al., showed that insurance coverage affects length of stay. They evaluated a cohort of 745 stroke patients and determined that length of stay was no different between Medicare patients and those with other coverage; however, Health Maintenance Organization (HMO) patients were less likely to have prolonged lengths of stay (Monane, Kanter, Glynn, Avorn, 1996). This however could be the result of better case management practices on the part of the HMO.

Many other studies have attempted to compare various independent variables to determine if outcomes can be predicted or improved. Two studies found that a majority of hip fracture patients did not return to pre-fracture levels of performance in the activities of daily living and there was no improvement at six and 12-month follow up intervals (Magaziner, Simonsick, Kashner, et al, 1990). Two other studies found that 10 to 39 percent of patients admitted from their homes for hip fractures were later admitted for indefinite periods or permanently to nursing homes (Ceder, Thorngren, Walden, 1980).

LOCAL COST DATA

Current payment rates in San Diego are up to \$1,000 per day for acute rehabilitation care and range from \$600-\$1,000. TRICARE provides examples of admission criteria for

patients to be admitted to acute rehabilitation. There are three levels for admission: Non-Catastrophic, Catastrophic Level-I, and Catastrophic Level- II.

Non-catastrophic care is provided to patients that undergo a trauma or disabling illness that requires up to four hours of therapy per day. The patient must be able to tolerate the therapy, and must show continuous improvement to remain institutionalized.

Catastrophic Level-1 is for patients that require 8-10 hours of nursing care each day. These patients must also receive the maximum amount of therapy of 4 hours per day. These include head injury, burn, and other patients.

Catastrophic Level-II is for patients that require at least 10 hours of nursing care each day and other intensive ancillary services. These are the most severely injured patients. Their care plan must be reviewed weekly, and they should be transferred to a lower level of care as soon as feasibly possible (The proprietary nature of the above information precludes the citation of a source).

Sub Acute rehabilitation services are reimbursed at a lower level than acute rehabilitation. The per diem payment rate ranges from approximately \$125.00 for Level-I to \$500 for level-V. Levels II through V are relevant to this study. Each level involves a different amount of nursing

and rehabilitation care. Level II involves concentrated nursing services such as wound care, 1.5 hours of therapy, intravenous therapy and other care. This level does not specify the amount of nursing hours that must be provided. Each level includes services provided at lower levels with the addition of new services that are added. The highest level, Level V is sub acute skilled nursing and includes ventilator care for up to 24 hours per day (due to the proprietary nature of the above information, exact descriptions could not be provided). Actual costs for the NMCS D and Naval Hospital Camp Pendleton catchment areas are provided later.

METHODOLOGY

This project is a feasibility study; therefore, its purpose is to determine if opening a mixed acute/sub-acute rehabilitation facility at NMCS D is a viable cost-effective option. This facility would focus on providing rehabilitation services that NMCS D is equipped to handle. This includes providing rehabilitation to patients that have DRGs such as those listed in Table 4. It does not include care for very high acuity patients, including Spinal Cord Injury, and Severe Head Injury patients. The San Diego Veteran's Hospital is equipped with the capability to meet the needs of these patients. This study dictates that the following variables must be measured:

- Utilization of inpatient rehabilitation care by beneficiaries ages 18-64.
- Utilization of inpatient rehabilitation care by beneficiaries ages 65 and above.
- Average cost per bed day.
- Potential Savings per bed day based on several models

Data and Source

In order to evaluate TSP network utilization, data was obtained from the TRICARE Management Activity, All Region Server (ARS) Bridge. The ARS was used because its data is considered "clean". The data is based on actual billing information from invoices that have been paid. It includes diagnosis (DRG) and length of stay for each patient as well as the total cost for each patient. Because this data is derived from previously paid invoices, it is considered valid and reliable.

The ARS Bridge was recently developed by the Executive Information/Decision Support Program Office in concert with the TRICARE Management Activity Health Program, Analysis, and Evaluation) Branch. The ARS-Bridge consists of a set of Military Health System data files, which include summary files, personal information files, and healthcare service files. Data is incorporated into the Executive Information Decision Support Central Database. Information provided

within the ARS Bridge is updated weekly and can be downloaded as a Microsoft Excel Worksheet. An interface program called WebIntelligence® is utilized to write ARS Bridge Ad Hoc reports as well as a set of standard reports.

For this research, the data consisted of the following: Admissions to network sub-acute and acute rehabilitation facilities during the years 1999-2000. Individual admission variables include dates of admission and discharge, the Diagnostic Related Groups (DRG), and the total cost per admission for patients within the NMCS D and Naval Hospital Camp Pendleton catchment areas. For privacy purposes, patient level data including name, age and social security number were not provided for this research. Utilization will be measured in the form of bed days per 1000 beneficiaries located within the NMCS D/Camp Pendleton catchment area. Past cost will be determined by averaging the costs for all patients utilizing data provided from the TRICARE Management Activity ARS Bridge for the years 1999-2000. This data consists of 700 ARS Bridge admissions to both acute and sub-acute rehabilitation facilities. A total of 3796 acute rehabilitation and 6526 sub acute rehabilitation bed days were utilized to care for these patients. Utilization information is used to determine bed requirements. Cost data is used to prepare a cost

benefit analysis and determine if NMCS D can provide inpatient rehabilitation at a lower cost than network providers.

Additional data was obtained from CHCS by creating an ADHOC report for extracting NMCS D admissions for the most common DRGs that result in discharges to both acute and sub acute rehabilitation facilities. This data was used to determine the number of discharges from NMCS D to rehabilitation. Additionally, it was used to examine other patient variables such as age, total bed days at NMCS D, and beneficiary category. The data included a total population of 730 patients.

Methods for Cost Analysis

Cost analysis was conducted using basic principles of managerial accounting. This feasibility study focused on projecting potential costs associated with operating a rehabilitation facility at NMCS D. Three staffing options were evaluated: First, resource sharing personnel, second, military personnel only and third, strictly Government Service Personnel. Additionally, the cost of constructing and operating a stand-alone facility in partnership with the Department of Veteran's Affairs was considered. The MHS is not concerned with making a profit, however, it should provide cost efficient care. Therefore, this study focuses on determining if the MHS can reap a substantial

cost avoidance by operating its own inpatient rehabilitation unit.

Managerial accounting involves forward thinking to determine if an alternative mode of delivery can lower costs and to assist leadership with making informed decisions. Therefore, assumptions must be made regarding utilization (volume) of services to determine future costs and potential targets for savings.

Since managerial accounting is forward looking, it involves inherent risks and there is no agreement regarding its rules (Gapenski, 1999). However, some basic managerial accounting principles will be followed during this analysis.

Good cost analysis includes the following elements. First, direct and indirect costs must be estimated. Indirect costs are those that are shared among the hospitals services. For instance, utilities are used by the entire hospital as are administrative services, security services, etc. Another name for indirect costs is overhead costs.

In some businesses, cost allocation is simple. Pricing healthcare services is significantly more complex. Each service involves various amounts of time, management involvement, supplies, equipment and other inputs.

Therefore it is much more difficult to allocate costs to an individual unit of service such as a bed day or a patient visit. It involves allocating all the indirect costs associated with each individual service.

There are three methods of cost allocation. NMCSO uses a step down method called the Military Personnel Expense Reporting System (MPERS). This step down cost allocation system is used to apply all direct and indirect costs to each unit of service. Therefore, some direct costs are averaged, and then applied to each patient bed day. Therefore, only an average cost per bed day can be calculated. If NMCSO had to provide an itemized bill to its patients or to a third party payer (insurance company), it could not (Gapenski, 1999).

The overall cost of providing each unit of service was evaluated by adding direct costs (D) to the estimated indirect cost (I), then dividing the sum by the number of services provided. This is called cost-volume-profit analysis (Gapenski, 1999). For instance, if $D = \$50/\text{unit}$ of service, and $I = \$100/\text{day of operation}$, then the cost if only one unit of service were provided would be \$150. However, if ten units of service are provided then the cost would be \$60/unit (Cost for 10 units = $((50 \times 10) + 100)/10$) = \$60/unit. These principles of managerial accounting were

used to determine costs. The cost-volume-profit analysis was used to compare estimated costs of the models listed above to the previously incurred costs associated with sending patients to TRICARE network facilities for inpatient rehabilitation. Volume was projected based upon past and current utilization of TRICARE network acute and sub acute rehabilitation facilities. Once costs were determined and volume estimated a pro-forma analysis was conducted to determine what the average cost for providing rehabilitation care at NMCS D was per patient day.

Labor Methodology

The labor required for providing direct care includes Registered Nurses (RN), Licensed Practical Nurses, and Therapists (Physical Therapists, Physical Therapy Technicians, Speech Pathologists, etc.) and a Physiatrist. A physiatrist is a physician that specializes in rehabilitation. Salary expenses for a 100 percent military-labor unit were calculated using the Military Composite Standard Pay and Reimbursement Rates schedule published by the Department of the Navy for fiscal year 2001. A Government Service Employee-labor cost was also calculated using a standard rate table provided by NMCS D's Resource Management Directorate.

Rates were calculated using a time/hourly cost system. The method for calculating labor costs was provided by using a formula provided by Lisa Holland, a local sub acute facility executive. The following method was used:

1. The number of beds was multiplied by the projected occupancy rate.
2. Occupancy was then multiplied by the number of nursing hours per day (3.2).
3. Total nursing hours were then divided by eight, the standard employee work shift. Costs could vary if shifts were changed to 12 hours and the ratio of registered nurses to LPNs and CNAs is changed. For this analysis, the mix was 50/50 (RNs/LPNs) to allow for simplicity.
4. Therapy costs were calculated at 1.5 hours of therapy per day and added to nursing costs. The cost of a physiatrist visit was also added.

The only requirement for a sub acute rehabilitation unit is that a RN is on duty at all times when patients requiring intravenous therapy are present. Staffing ratio requirements are difficult to assess. There is significant disagreement in California on this issue. Currently though, the California Nurses Association (CNA) recommends a ratio of one nurse for every four patients. This contrasts drastically with the California Healthcare Association's recommendation of one nurse

to every 16 patients (J. Tieman, 2001). This indicates that staffing is at the discretion of management. It is estimated that each patient would require an average of 3.2 hours of nursing care per day. A census of 30 patients would therefore require 96 hours of nursing care per day. Additionally, for a facility to receive reimbursement from Medicare, the patient must receive a minimum of three hours of direct nursing care per day. The training level of the nursing staff is not relevant unless the patient requires intravenous therapy therefore; Certified Nurse Assistants or Licensed Practical Nurses could be used extensively. This would lower costs significantly.

Outcomes

In addition to the financial and utilization analysis, an analysis of the literature was conducted to determine if an Inpatient Rehabilitation Facility at NMCSO would result in better outcomes for its patients. A statistical analysis is not possible at this time due to the lack of good outcome data. The original intent was to statistically analyze whether rehabilitation interventions result in outcomes that allow patients to return to work faster. This goal however is not achievable at this time. Therefore, only the literature was reviewed. Additionally, the results of a command audit of local rehabilitation providers are provided.

The following hypotheses were tested for this feasibility study:

Hypotheses

1. Ho: Current rehabilitation facility utilization does not justify the provision of inpatient rehabilitation at NMCSO.

Ha: Providing inpatient rehabilitation at NMCSO is a more cost effective alternative than the status quo.

2. Ho: The costs associated with physician fees, ancillary services, ambulance services, and other services not provided by NMCSO do not justify direct care at NMCSO.

Ha: providing on site rehabilitation and skilled nursing can significantly reduce Physician fees, ancillary costs, ambulance costs, and others.

3. Ho: The current system provides for adequate access to skilled nursing and rehabilitation care.

Ha: Access to skilled nursing and rehabilitation is not adequate. An on site facility would result in better access to those services.

4. Ho: The current system provides quality outcomes for patients when considering return to work, and length of stay in the hospital.

Ha: Inpatient rehabilitation at NMCSD will allow patients to return to work faster and result in shorter lengths of stay in the acute care setting.

FINDINGS

Utilization

To accurately project utilization, an analysis of eligible beneficiaries was necessary. Table 3 shows the current eligible population over age 18 years by beneficiary category (Managed Care Financial Analysis

Table 3. NAVAL MEDICAL CENTER CATCHMENT AREA ELIGIBLE BENEFICIARIES

Age Cat.	AD	ADFM	Retired	Ret. FM	Survivor	Other	Total
18-24	26,551	7,601	42	6,905	254	94	41,447
25-34	22,022	12,397	329	764	68	304	35,884
35-44	13,781	8,423	4,193	4,586	200	111	31,294
45-64	1,992	2,610	21,076	18,350	1,959	28	46,015
65-Above	2	551	18,255	11,040	7,201	6	37,055
Total:							191,695
Percent above age 65:		19%					
Percent below age 64		81%					

Source: Managed Care Forecasting and Analysis System, December 2000

This data consists of all eligible military healthcare beneficiaries by age, and military status. A significant finding is that over 19 percent of eligible adult beneficiaries are over 65 years of age. This is important to consider when examining data presented later. Specifically, the reader should keep in mind that the United States Congress recently passed legislation authorizing TRICARE benefits to the over 65 population.

The results of the 2001 Defense Authorization act are currently unknown, and it has not been determined how TRICARE for Life will work.

The TSP program is expected to end in December 2001. It is assumed that NMCS D will continue caring for those members who are currently enrolled but they will not be considered as "prime" patients (Diaz, Personal Communication, May 25th, 2001) (Personal Communication, Captain Minnick, Office of the Lead Agent, Region Nine, March 2001). Whatever the result of the Defense Authorization Act, it must be clear that utilization drives costs, and therefore, utilization management is a critical component of any managed care organization (Kongstvedt, 1997, p. 199).

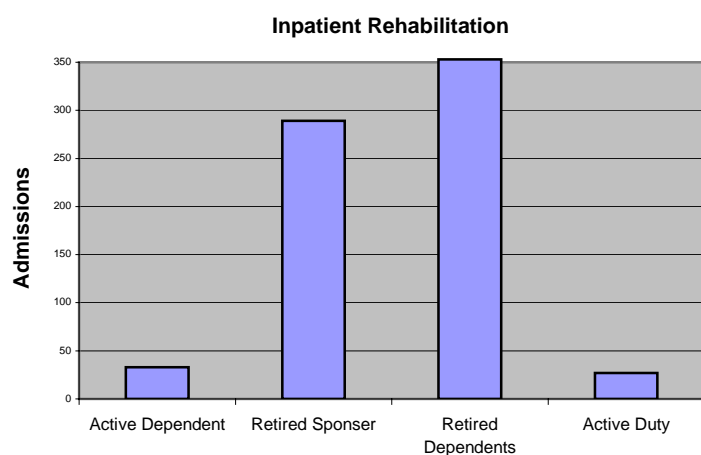
Although the TSP program will end in December 2001, at the time of this writing, the leadership is not certain what will happen. Therefore, calculations for this project are made assuming NMCS D will continue to be responsible for financing the care of TSP members. These members are provided the same enhanced health care benefit that other TRICARE Prime members are provided.

To complete the utilization estimate, actual costs are compared to projected costs using occupied bed days per 1000 members. Bed requirements are needed to determine

costs under any model. Therefore, an evaluation of costs incurred based on actual past bed utilization is presented first.

A summary of the actual data is provided in Tables 4 through 6, and in Figure 1. Admissions totaled 703 patients. The top ten diagnoses related groups (DRGs) are included in Table 4 and account for 50 percent of total admissions. Figure 1 shows that over 44 percent of admissions consisted of retired dependents and 36 percent consisted of retired military members (sponsors) totaling 80 percent of rehabilitation admissions. Table 4 is a breakdown of total bed days by year and month. Bed days increased from 4594 in 1999 to 5728 in 2000.

Figure 1. Inpatient Rehabilitation by Beneficiary Category



Diagnosis Related Group Nomenclature	DRG	Admissions	Percentage of Admissions
Cardiovascular Disorders	14	100	14.2%
Fractured hip and Pelvis	236	65	9.3%
Rehabilitation	462	30	4.3%
Heart Failure and Shock	127	26	3.7%
Bone Disease and Arthroscopies	245	25	3.6%
Pulmonary Adema	87	17	2.4%
Cronic Obstructive Pulmonary Disease	88	17	2.4%
Simple Pneumonia	89	16	2.3%
Respiratory Infections and Inflammation	79	12	1.7%
Respiratory System and Ventalator Support	475	11	1.6%
TOTAL:		354	50%

Table 4. Top DRGs Admitted to Rehabilitation in 2000

**Table 5. 1999-NMCSD/Camp Pendleton Catchment Area
Cumulative Bed Days for Acute and Sub acute Rehabilitation**

Year	Month	Sub Acute		Total
		Rehabilitation	Rehab/SNF	
1999	Jan	119	114	233
	Feb	231	170	401
	Mar	115	236	352
	Apr	220	185	405
	May	173	283	456
	Jun	2	262	264
	Jul	51	231	282
	Aug	112	250	362
	Sep	58	281	339
	Oct	160	261	422
	Nov	218	301	520
	Dec	159	399	557
Grand Total		1619	2975	4594

Source: *All Region Server (Bridge)*

**Table 6. 2000- NMCSD/Camp Pendleton Catchment Area
Cumulative Bed Days for Acute and Sub acute Rehabilitation**

Year	Month	Sub Acute		Total
		Rehabilitation	Rehab/SNF	
2000	Jan	139	320	460
	Feb	221	242	463
	Mar	262	190	451
	Apr	265	78	342
	May	212	209	421
	Jun	148	210	358
	Jul	211	366	577
	Aug	222	533	755
	Sep	285	554	839
	Oct	139	397	536
	Nov	19	276	294
	Dec	55	175	230
Grand Total		2177	3551	5728

Source: *All Region Server (Bridge)*

Utilization Estimate Age 65 and Above

Figure 2 provides a good picture of the trend in 1999 (ARS-Bridge, 1999). TSP enrollment also increased sharply during that same period. TRICARE Senior Prime inpatient

**Table 7. TRICARE Senior Prime Network Acute and Subacute
Rehabilitation Admissions per month**

Jul-99	Aug-99	Sep-99	Oct-99	Nov-99	Dec-99
22	21	24	19	32	31
Jan-00	Feb-00	Mar-00	Apr-00	May-00	Jun-00
41	26	9	26	37	16

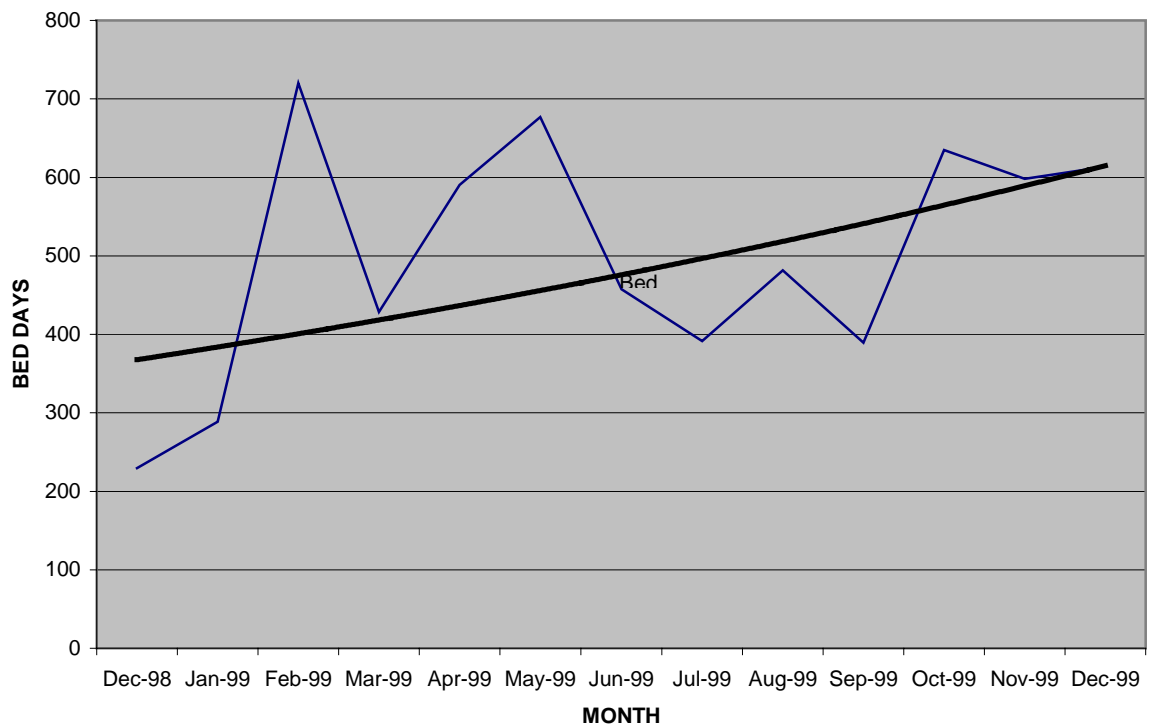
acute and sub-acute rehabilitation admissions are shown in Table 7 above. Bed requirements for TSP members consist of 348-652 bed days/1000 members (ARS Bridge, 1999). The average over 13 months is 500-bed days/1000 members (ARS Bridge, 1999).

To determine bed requirements, the average bed days/1000 members were divided by thirty (representing the days/month) for required beds. Table 8 shows that an average of 23 beds is required per month with a high of 31 beds.

Table 8. TRICARE Senior Prime Network Acute and Subacute Admissions/1000

Descriptive Statistics	Admissions per Month	Occupied Bed Days	
Average Admissions per Month/1000:	26	Average Length of Stay	28
Standard Deviation:	9	Bed Requirements per 1000:	704
Average Admissions + 1 Std. Dev.	34	High Bed Day Requirements:	942
Average Admissions - 1 Std. Dev.	17	Low Bed Day Requirements:	467
Average Bed Requirement:	23		
High Bed Requirement	31		
Low Bed Requirement:	16		

Figure 2. Acute and Sub-acute Rehabilitation Bed Days per 1000 Tricare Senior Prime



Utilization Estimate Ages 18-64

Bed requirements for TRICARE beneficiaries age 18-64 were calculated in the same manner as for TSP members. The average requirement was determined to be 3.7 beds as shown in Table 9. The high for this group was 6.7 beds in June 2000, and the low was 0.8 beds.

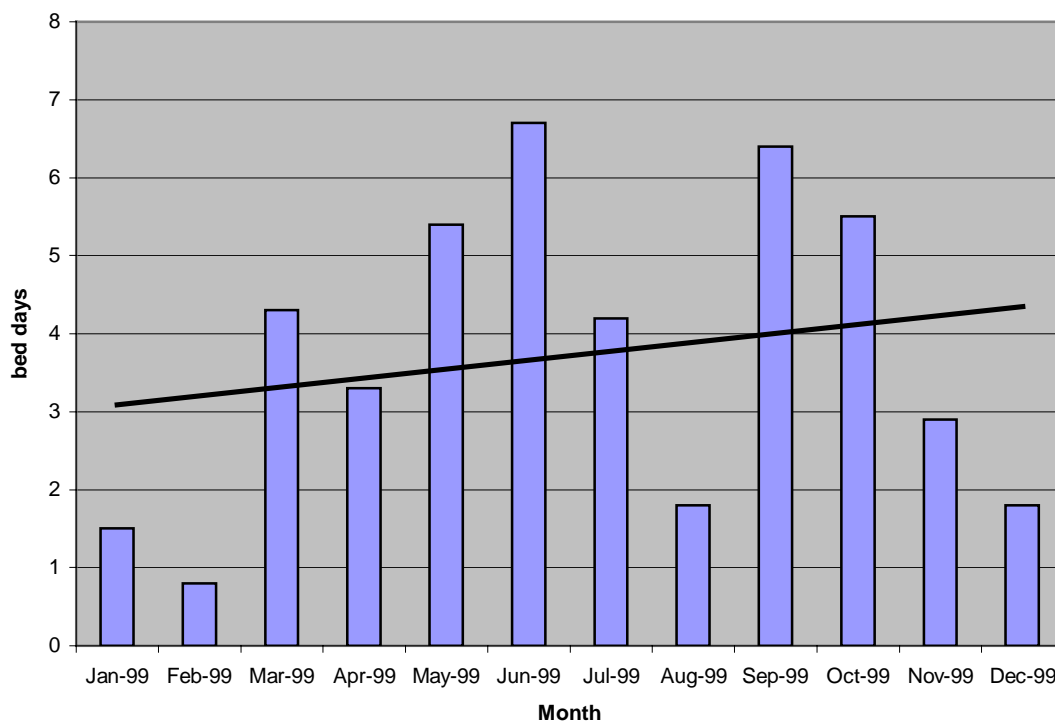
Table 9. Tricare Prime Acute and Subacute Rehabilitation Admissions per Month

Jul-99	Aug-99	Sep-99	Oct-99	Nov-99	Dec-99
4.2	1.8	6.4	5.5	2.9	1.8
Jan-00	Feb-00	Mar-00	Apr-00	May-00	Jun-00
1.5	0.8	4.3	3.3	5.4	6.7
Avg	2.25				
High	6.7				
Low	0.8				

The trend for this age group is shown in Figure 3. Now that bed requirements for the two age groups have been calculated, they can be added to determine the total requirement.

The average requirement for beds for TSP, and the under

**Figure 3. TRICARE Prime Enrolled Rehabilitation Facility
Occupied Bed Days /1000 Members**



65 age groups adds up to 27 beds when rounded ($23 + 4$). The high requirement is for 39 beds when rounded ($32 + 7$). Therefore, costs will be calculated using 30 beds as a requirement. However, before costs are calculated, an estimate of underutilization of inpatient acute and sub acute rehabilitation will be discussed.

Estimating Underutilization

Evidence above suggests that inpatient acute and sub-acute rehabilitation services are currently underutilized for all age groups. The NMCSO currently tracks potentially avoidable occupied bed days (AOBDs). Potential avoidable bed days are an indicator that patients are over-utilizing acute care services. The estimated cost for potentially avoidable bed days in 2000 was over \$1.81 million. Fifty percent of the AOBDs were for mental health care, which is unrelated to this study. If some of these patients are kept in the in-patient setting because access to inpatient rehabilitation is limited, then there is potential to save over \$900,000 (NMCSO Intranet, Healthcare Operations and Planning). Hard data was not available for analysis of the above information therefore further research was conducted.

Accurately assessing under utilization of inpatient rehabilitation is difficult. However, an analysis of CHCS data was conducted for patients admitted to NMCSO for DRGs that often result in admissions to rehabilitation facilities. The data consisted of a total population of 741 admissions. Eleven patients were omitted because of death, resulting in the final population of 730 admissions for fiscal year 2000.

The Appendix provides the number of patients according to their length of stay. For instance, the top row consists of 204 patients that stayed for only one day. It also includes a column for the average length of stay (ALOS) for the population, which was six days. Length of stay (LOS) was multiplied by the number of patients in each row and the total days were multiplied by the average length of stay. This results in the following equation $((\text{LOS} \times \text{TOT Days}) - (\text{Number of Patients} \times \text{ALOS}))$. For the first row of the Appendix, the result is $((1 \times 204) - (204 \times 6)) = -1305$. This row represents a saving of 1305.6 days. Total days saved is provided at the bottom of the table as "Days Saved". These are admissions that required less than the ALOS and are considered a good outcome unless patients are being discharged before they are ready. Days saved totaled 2787 and represented 597 patients. Underutilization of rehabilitation is represented by total days lost.

The calculations in the Appendix resulted in 963 total days lost (days that exceed average length of stay). These total days are for 105 admissions representing only 14.4 percent of the population. The cost per day for the Med-Surgical Ward at NMCSD is \$530 when using MPERS Data. This leads to an estimated cost for lost days of \$510,390. Perhaps many of the admissions that exceed average length

of stay could be better served by a rehabilitation facility. Secondly, moving patients into rehabilitation may result in the increased availability of acute care beds. This may result in fewer non-availability statements (authorizations for network inpatient services). Finally, our costs for an acute care bed, using MPERS, are lower than what the network facilities are charging on average.

Past Costs for Inpatient Rehabilitation

A retrospective analysis of past costs for inpatient rehabilitation is important in determining the feasibility of creating an inpatient rehabilitation unit. Table 10 shows that during the years 1999 and 2000, \$8.98 million was spent providing beneficiaries with acute and sub-acute inpatient rehabilitation services in the civilian network. In 1999, spending totaled \$3.39 million for 4594 total bed days, and an average cost per day of \$738. The average length of stay was 13.47 days.

Costs rose in fiscal year 2000; they bloomed to \$5.591 million for 5728 total bed days at an average cost per day of \$976. The average length of stay also increased to 18.24 days. A sum of bed days is also provided in Table 6. Therefore, if the NMCS D is to benefit from providing an inpatient rehabilitation unit, the costs must be significantly less than \$5.591 million.

NMCSD PROJECTED COSTS

After determining the costs for rehabilitation care in the civilian network, costs were estimated for the operation of an inpatient rehabilitation unit at NMCSD. Table 10 shows the non-labor costs associated with a rehabilitation unit at NMCSD for a 30-bed unit. This cost is estimated at \$774,816 per year. These costs were estimated using the Manpower Expense Reporting System (MPERS) to determine both fixed costs, and stepped down costs. The Computation Expense Summary for account code-AAXA (Ward 4-West, NMCSD) was used to provide the cost estimation. Ward 4 west was chosen because its cost structure is comparable to the cost structure of a rehabilitation ward. Contract salaries were estimated by using the California Salary Schedule for San Diego (California Department of Labor). These salaries are calculated at the 75th percentile for labor in San Diego County.

A summary of labor costs for both acute and sub acute rehabilitation are provided in Tables 11 through 13. The bottom right corner of each table provides costs for a 100 percent sub acute facility, a facility with a 50/50 mix of acute and sub acute patients, and a 100 percent acute facility. In the event of actual start up, staffing levels would need to be adjusted according to patient census, and the actual acuity mix of patients.

Table 10. Estimated Non-Labor Costs for a Rehabilitation Unit at NMCS D

Service	Costs	Cumulative Costs	Cost/bed day
Administrative Cost	150,000	150,000	\$ 16.44
Clinical Management	218,457	368,457	\$ 23.94
Central Sterilization	40,000	408,457	\$ 4.38
Command	9,545	418,002	\$ 1.05
Education and Training	27,139	445,140	\$ 2.97
Utilities	32,424	477,565	\$ 3.55
Real Property	26,714	504,278	\$ 2.93
Engineering Support	14,080	518,359	\$ 1.54
Fire Protection	300	518,659	\$ 0.03
Police Protection	11,236	529,894	\$ 1.23
Communications	23,492	553,386	\$ 2.57
Other MTF Support	4,134	557,520	\$ 0.45
Materials Management	36,000	593,520	\$ 3.95
Housekeeping	23,897	617,417	\$ 2.62
Biomed Repair	8,500	625,917	\$ 0.93
Laundry	115,744	741,661	\$ 12.68
MTF Managed Care	33,155	774,816	\$ 3.63
TOTAL:		\$774,816	\$ 84.91

Calculations are based upon the following:

Facility of 7000 square feet

Total bed days of 9,125 at 25 patients per day

It is possible that nursing staff can be floated from the rehabilitation unit to work with acute patients when census levels are low. Of course, the opposite is also true for the acute care setting. The above personnel costs will be used to calculate costs for a facility at NMCS D and for a facility

Table 11. Military Labor Costs**MILITARY LABOR COSTS PER OCCUPIED BED DAY FOR SUB-ACUTE REHABILITATION**

Percent Occupied	Occupied Beds	Nursing Hours per Patient Day	Total Nursing Hours	Hours Per Shift	Nurses Per Shift	Nurses Per 24 Hour Shift	Military RN and Corpsman @ Avg. of \$27/hour	Nursing Cost per Patient	Therapy Cost per Day @ 1.5 Hours	Physiatrist @ \$25 per 1/2 hour visit	Total Military Cost Per Patient Day
100%	30	3.2	96	8	12	36	\$ 7,776.00	\$ 259.20	\$ 76.59	\$ 17.00	\$ 352.79
90%	27	3.2	86	8	11	32.4	\$ 6,998.40	\$ 259.20	\$ 76.59	\$ 17.00	\$ 352.79
80%	24	3.2	77	8	10	28.8	\$ 6,220.80	\$ 259.20	\$ 76.59	\$ 17.00	\$ 352.79
70%	21	3.2	67	8	8	25.2	\$ 5,443.20	\$ 259.20	\$ 76.59	\$ 17.00	\$ 352.79
60%	18	3.2	58	8	7	21.6	\$ 4,665.60	\$ 259.20	\$ 76.59	\$ 17.00	\$ 352.79
50%	15	3.2	48	8	6	18	\$ 3,888.00	\$ 259.20	\$ 76.59	\$ 17.00	\$ 352.79
40%	12	3.2	38	8	5	14.4	\$ 3,110.40	\$ 259.20	\$ 76.59	\$ 17.00	\$ 352.79
100% Sub Acute Costs:											\$ 352.79
**Acute Rehabilitation Cost:											\$ 705.58
50/50 Mix Acute and Sub acute Rehabilitation Cost:											\$ 529.19

*Assumes a 50/50 split of Registered Nurses (Paygrade 0-2) and Corpsman (Paygrade E-3) based on the Military Pay Scale for 2001. The Hourly Rate Factor is .00055.

** Doubles the Nursing and Rehabilitation Hours

Table 12. Government Service Labor Costs**GOVERNMENT SERVICE LABOR COSTS PER OCCUPIED BED DAY FOR SUB-ACUTE REHABILITATION**

Percent Occupied	Occupied Beds	Nursing Hours per Patient Day	Total Nursing Hours	Hours Per Shift	Nurses Per Shift	Nurses Per 24 Hour Shift	*Gov. Service Nurses Average of \$18.00/Hour	Nursing Cost per Patient	Therapy Cost per Day @ 1.5 Hours	Physiatrist @ \$25 per 1/2 hour visit	Total Gov. Service Cost Per Patient Day
100%	30	3.2	96	8	12	36	\$ 5,184.00	\$ 172.80	\$ 36.00	\$ 16.00	\$ 224.80
90%	27	3.2	86	8	11	32.4	\$ 4,665.60	\$ 172.80	\$ 36.00	\$ 16.00	\$ 224.80
80%	24	3.2	77	8	10	28.8	\$ 4,147.20	\$ 172.80	\$ 36.00	\$ 16.00	\$ 224.80
70%	21	3.2	67	8	8	25.2	\$ 3,628.80	\$ 172.80	\$ 36.00	\$ 16.00	\$ 224.80
60%	18	3.2	58	8	7	21.6	\$ 3,110.40	\$ 172.80	\$ 36.00	\$ 16.00	\$ 224.80
50%	15	3.2	48	8	6	18	\$ 2,592.00	\$ 172.80	\$ 36.00	\$ 16.00	\$ 224.80
40%	12	3.2	38	8	5	14.4	\$ 2,073.60	\$ 172.80	\$ 36.00	\$ 16.00	\$ 224.80
Sub acute Rehabilitation:											\$ 224.80
**Acute Rehabilitation Cost:											\$ 449.60
50/50 Mix Acute and Sub acute Rehabilitation Cost:											\$ 337.20

*Assumes a 50/50 split of Registered Nurses and Liscensed Practical/Vocational Nurses.

** Doubles the Nursing and Rehabilitation Hours

operated in conjunction with the Department of Veteran's Affairs. The system used above essentially places labor costs into the category of fixed direct costs.

Various administrative personnel currently occupy facilities originally designed for patient care. They are using electricity, water, and cleaning services among others without generating patient care services. Therefore, many of the costs shown in Table 10 are already incurred in an

Table 13. Contract Labor Costs

CONTRACTED LABOR COSTS PER OCCUPIED DAY FOR SUB-ACUTE REHABILITATION											
Percent Occupied	Occupied Beds	Nursing Hours per Patient Day	Total Nursing Hours	Hours Per Shift	Nurses Per Shift	Nurses Per 24 Hour Shift	RNs and CNAs	Nursing Cost per Patient	Therapy Cost per Day @ 1.5 Hours	Physiatrist @ \$25 per 1/2 hour visit	Total Contracted Cost Per Patient Day
100%	30	3.2	96	8	12	36	\$ 6,912.00	\$ 230.40	\$ 39.66	\$ 18.00	\$ 288.06
90%	27	3.2	86	8	11	32.4	\$ 6,220.80	\$ 230.40	\$ 39.66	\$ 18.00	\$ 288.06
80%	24	3.2	77	8	10	28.8	\$ 5,529.60	\$ 230.40	\$ 39.66	\$ 18.00	\$ 288.06
70%	21	3.2	67	8	8	25.2	\$ 4,838.40	\$ 230.40	\$ 39.66	\$ 18.00	\$ 288.06
60%	18	3.2	58	8	7	21.6	\$ 4,147.20	\$ 230.40	\$ 39.66	\$ 18.00	\$ 288.06
50%	15	3.2	48	8	6	18	\$ 3,456.00	\$ 230.40	\$ 39.66	\$ 18.00	\$ 288.06
40%	12	3.2	38	8	5	14.4	\$ 2,764.80	\$ 230.40	\$ 39.66	\$ 18.00	\$ 288.06
100% Sub Acute Cost:											\$ 288.06
**Acute Rehabilitation Cost:											\$ 576.12
50/50 Mix Acute and Sub acute Rehabilitation Cost:											\$ 432.09

*Assumes a 50/50 split of Registered Nurses and CNAs.

** Doubles the Nursing and Rehabilitation Hours

area of the hospital designed for the provision of patient care. Total cost per bed day was also calculated and was found to be significantly lower than the current network costs.

Utilizing the figures in Table 10, total cost per bed day is shown in Tables 14 through 16 under the heading "Total Cost Per Bed Day". Each is based on the type of labor used and the acuity mix for each model. Therefore, total costs range from \$309 per day for a 100 percent sub acute facility with Government Service Wage Employees to a high of \$790 per day for

a 100 percent acute rehabilitation facility using military labor. The result of each model is that the government would reap savings ranging from \$1.07 Million to \$3.8 million

Table 14. Total Cost and Estimated Cost Avoidance for a 100 Percent Sub Acute Rehabilitation Facility

Total Cost and Estimated Cost Avoidance for a 100 Percent Sub Acute Rehabilitation Facility						
Labor Source	Amount	Support Services	Total Cost per Day	Cost per Year	Cost Avoidance	
Government Service	\$ 224.80	\$ 85	\$ 309.80	\$ 1,774,534	\$ 3,825,466	
Military Labor	\$ 352.79	\$ 85	\$ 437.79	\$ 2,507,661	\$ 3,092,339	
Contract Labor	\$ 288.06	\$ 85	\$ 373.06	\$ 2,136,888	\$ 3,463,112	

Cost avoidance is based on a year 2000 cost of \$5.6 Million. It would vary by volume, actual labor costs, medical inflation and other factors.

Table 15. Total Cost and Estimated Cost Avoidance for a 100 Percent Acute Rehabilitation Facility

Total Cost and Estimated Cost Avoidance for a 100 Percent Acute Rehabilitation Facility						
Labor Source	Amount	Support Services	Total Cost per Day	Cost per Year	Cost Avoidance	
Government Service	\$ 449.60	\$ 85	\$ 534.60	\$ 3,062,189	\$ 2,537,811	
Military Labor	\$ 705.58	\$ 85	\$ 790.58	\$ 4,528,442	\$ 1,071,558	
Contract Labor	\$ 576.12	\$ 85	\$ 661.12	\$ 3,786,895	\$ 1,813,105	

Cost avoidance is based on a year 2000 cost of \$5.6 Million. It would vary by volume, actual labor costs, medical inflation and other factors.

Table 16. Total Cost and Estimated Cost Avoidance for a 50/50 Percent Acute /Sub Acute Rehabilitation Facility

Total Cost and Estimated Cost Avoidance for a 50/50 Acute/Sub Acute Rehabilitation Facility						
Labor Source	Amount	Support Services	Total Cost per Day	Cost per Year	Cost Avoidance	
Government Service	\$ 337.20	\$ 85	\$ 422.20	\$ 2,418,362	\$ 3,181,638	
Military Labor	\$ 529.19	\$ 85	\$ 614.19	\$ 3,518,080	\$ 2,081,920	
Contract Labor	\$ 705.58	\$ 85	\$ 790.58	\$ 4,528,442	\$ 1,071,558	

Cost avoidance is based on a year 2000 cost of \$5.6 Million. It would vary by volume, actual labor costs, medical inflation and other factors.

Alternatives to Providing Inpatient Rehabilitation at NMCSO

After determining the costs for providing care at NMCSO a thorough pro-forma, examining other alternatives will follow. The first alternative is to maintain the status quo. That is, continue sending patients to network institutions for rehabilitation care services at a cost of \$3 to \$5.6 million annually. Another alternative is to join forces with the Department of Veteran's Affairs (DVA). This alternative would involve two potential models.

The first would involve providing space for the DVA at NMCSO, allowing them to provide manpower. The second alternative is to allow the DVA to lease space and allow NMCSO/Region-Nine Lead Agent to provide manpower. Both alternatives could allow for treatment of both DVA beneficiaries, and military beneficiaries. Only the second alternative will be thoroughly examined. This is because we already know the cost of labor, therefore, NMCSO's costs for bringing DVA employees into NMCSO would only involve services (\$85 per bed day) as shown in Table 10, and some negotiated cost share for labor, as labor costs range from 80-90 percent of total costs.

The second option was to have the DVA lease or build a facility at another location, or use its own facilities with the Navy supplying the manpower. This would result in the Lead Agent's costs becoming the same as the DVA's in the example

above. However, the DVA's cost would probably rise due to the cost of leasing or buying. For example, the lease might cost \$100,000 per month at \$5.00 per square foot for a 20,000 square foot facility. Then, additional costs must be added for custodial/janitorial services, additional administrative staff, utilities, equipment, patient transportation and others. Table 17 is an estimate of fixed costs for a new building, equipment and operations. These costs are simply an estimate based upon NMCS D's utilization. They could actually be more or less when DVA utilization is considered.

Table 17. Fixed Costs for a 10,000 Square Foot Rehabilitation Facility

Total Fixed Costs for a 10,000 Square Foot Rehabilitation Facility		
	Fixed Costs	Total Costs
Salaries and Benefits:		
Management	80,000	80,000
Director of Nursing	75,000	155,000
Clerical/Administrative	60,000	215,000
Janitorial and Facilities	100,000	315,000
Utilities	55,600	370,600
Maintenance	50,000	420,600
Allocated Costs/Depreciated	143,666	564,266
Land Depreciation at \$5 million Cost	166,667	730,933
	Total Fixed:	<u>\$ 730,933.00</u>

These costs are estimated based on the assumptions listed in Table 18. The sources listed came primarily from the Internet. However, in the case of utilities, the cost of electricity was estimated using comparisons to a local rehabilitation hospital.

Table 18. Cost Projection Assumptions for a New Facility

Item	Unit	Cost/Unit	Total Units	Total Cost	Source
Land	Acres	1,000,000	5	5000000	San Diego, Union Tribune
Building	Square Foot	\$431	10,000	4310000	Department Of Veteran's Affairs
Equipment:					
Beds	Each	1500	30	45000	Hospital Supply Company (Web)
Furniture	Each	250	30	7500	Estimate
Computers	Each	3000	10	30000	Dell.Com
Radiology Eq.	X-Ray Machine	1000000	1	1000000	Estimate based on personal interviews
Office Furniture	Empl/visitors	Misc	Unknown	100,000	Estimate
Other Misc.	N/A	N/A	N/A	50,000	Estimate
Utilities:					
Electricity	Square Foot/Month	0.33	10,000	39600	California Public Utilities Commission
Water	Annual Use per Bed	300	30	9000	California Public Utilities Commission
Phones and Internet	Phone Lines	10	55	6600	California Public Utilities Commission
Fixed Labor:					
Manager	Health Care Adm	80000	1	80000	California Dept. Of Labor
Nurse Director	BSN or MSN	75000	1	75000	California Dept. Of Labor
Janitorial & Maint.	Labor	33000	3	99000	California Dept. Of Labor

COST ESTIMATE FOR A NEW REHABILITATION FACILITY

The total costs for a new facility were estimated on data obtained on the World Wide Web. These costs include building and land, operating costs, labor costs, and variable costs. After the annual costs were estimated, variable costs for supplies were calculated at \$25.00 per patient per day. Each section of Table 18 will be discussed in the order it appears.

The first section is the costs for a new building and land. The cost of land was estimated by looking in the San Diego Union Tribune's classified section. The cost for commercial property was based on prices found in ads for San Diego property listings. Property costs were then estimated at \$1 million per acre. An estimated requirement for five acres for the building, parking, and common areas results in a cost of \$5 million.

The cost for building construction is based on the cost of current construction for a new VA facility, which is 58,000 square feet and will cost \$25 million. This results in a cost of \$431 per square foot. Then, by multiplying \$431 times the proposed building size of 10,000 square foot, a net cost of \$4.31 million is found (Department of Veteran's Affairs). The total cost for the land and building is therefore estimated at \$9,431,000. Straight-line depreciation of 30 years can then be used to calculate estimated annual capital costs at \$310,333 per year.

Table 18 also displays costs for equipment, and utilities and fixed labor such as management. Equipment costs were primarily estimated. In the case of beds, their cost was found to be approximately \$1500 each, and other miscellaneous furnishings are estimated at \$250 per bed. Other costs might include televisions, and other comfort items. However, without painstakingly preparing a complete list, office equipment and furniture was estimated to cost \$100,000; another \$1,000,000 was added for radiology equipment; and \$50,000 was added for other miscellaneous equipment. These costs could be more, or less depending on how sophisticated the equipment might be. Straight line depreciation was then taken over five years on all equipment and furnishings (Costs were estimated using the

American Discount Home Medical Equipment web site: (www.americandiscounthome.com).

A new facility would require wheel chairs, walkers, and other patient transfer equipment. Additionally, physical therapy equipment and supplies as well as those for other professional services would be required. Utility costs were also estimated using the California Public Utilities web site. Utilities include; Gas and electricity, water, and phone and Internet services. Power use was estimated at \$.33 per square foot per month. The result is a cost of \$39,600 per year (personal interview, Local Hospital Facilities Manager, March 2001). Usage was estimated to be higher than average due to the 24-hour working environment and the need to supply power to medical equipment. According to the California Public Utilities Commission, the average person uses 324 kWh/month.

Water use was calculated at 150 gallons per person/day. This resulted in a cost of \$9,000 annually. Phones and Internet connections were estimated to cost \$10 per month per phone for 55 phone lines at a cost of \$6,600 annually. An arbitrary maintenance cost was also added at \$50,000 per year for buildings and equipment. A maintenance person is included in the cost of labor.

Finally, labor costs were calculated to include administrative support and management. An estimated cost of

\$100,000 for custodial and maintenance services was added. The total fixed costs were then added for a sum of \$730,933. Variable costs were then estimated at \$25 per bed per day for supplies, laundry, and other miscellaneous needs. Table 18 shows that a 100 percent occupancy rate would produce total annual estimated variable costs of \$273,750. Table 19 shows that when using the total cost of

Table 19. Cost Volume Analysis

Cost/Volume Analysis					
Average Occupancy	Bed Days per Year	Fixed Costs	Total Variable Costs	Total Costs	Average Costs
100%	10950	731,000	273,750	1,015,700.00	\$ 92.76
83%	9125	731,000	228,125	968,250.00	\$ 106.11
67%	7300	731,000	182,500	920,800.00	\$ 126.14
50%	5475	731,000	136,875	873,350.00	\$ 159.52
33%	3650	731,000	91,250	825,900.00	\$ 226.27

This analysis does not include the cost of Nursing, Therapy, and Physican Services

\$1.01 million, the result is a cost of \$92.76 per bed day. This does not include the cost of direct patient care labor. Total cost with labor will be discussed later. An additional cost of \$15.00 per bed day could hypothetically be avoided by constructing a new facility on land already owned by the military or the Department of Veteran's Affairs. This would result in a further cost avoidance of \$164,250 per year. The fixed costs without land acquisition are shown in Table 20. The cost per bed day (100 percent occupancy) is \$77.51, again, not including direct patient

care labor. Table 21 shows that the cost with direct labor (As calculated earlier for an NMCSO facility) range from a low of \$301 with Government Service labor at 100 percent occupancy to \$533 with military labor at 33 percent occupancy. The cost per bed day when land acquisition is included increases to a range of \$316 to \$579 with the same labor considerations.

Table 20. Cost /Volume Analysis without Land Acquisition

Cost/Volume Analysis without Land Acquisition					
Average Occupancy	Bed Days per Year	Fixed Costs	Total Variable Costs	Total Costs	Average Cost per Day
100%	10950	564,000	273,750	848,700.00	\$ 77.51
83%	9125	564,000	228,125	801,250.00	\$ 87.81
67%	7300	564,000	182,500	753,800.00	\$ 103.26
50%	5475	564,000	136,875	706,350.00	\$ 129.01
33%	3650	564,000	91,250	658,900.00	\$ 180.52

This analysis does not include the cost of Nursing, Therapy, and Physician Services

After considering the above costs, past utilization must be considered. The total utilization in 2000 was 5728 bed days. This would result in an occupancy rate of 52 percent. Using the chart above, cost per bed day would range from \$353 to \$512 in a sub acute rehabilitation facility depending on the labor source. Labor costs for a 100 percent acute rehabilitation facility would double for a range of \$629 through \$947 per bed day for a facility without land costs. An additional cost of \$15 should be added for a facility that includes land. Total annual cost avoidance would range from \$2.66 million using an average

cost of \$512 per bed day to only \$175,584 using a daily cost of \$947. It is likely that the average cost would be closer to \$600-\$700 per bed day given a facility that rehabilitates both acute and sub acute patients.

Ancillary and Ambulance Services

Determining the utilization of ancillary services by institutional rehabilitation patients is difficult. Currently, the Managed Care Support Contractor pays an all-inclusive per diem rate for most ancillary services

Table 21. Total Cost/Day for a New Stand Alone Rehabilitation Facility (Sub-Acute) No Land Cost

Average Occupancy	Fixed Cost	Contract Labor	Government Service	Military Labor	Total with Contract Labor	Total with Government Services
100%	\$ 77.50	\$ 288.00	\$ 224.00	\$ 352.79	\$ 365.50	\$ 301.50
83%	\$ 87.10	\$ 288.00	\$ 224.00	\$ 352.79	\$ 375.10	\$ 311.10
67%	\$ 103.00	\$ 288.00	\$ 224.00	\$ 352.79	\$ 391.00	\$ 327.00
50%	\$ 129.00	\$ 288.00	\$ 224.00	\$ 352.79	\$ 417.00	\$ 353.00
33%	\$ 180.50	\$ 288.00	\$ 224.00	\$ 352.79	\$ 468.50	\$ 404.50

Total Cost/Day for a New Stand Alone Rehabilitation Facility (Sub-Acute)

Average Occupancy	Fixed Cost	Contract Labor	Government Service	Military Labor	Total with Contract Labor	Total with Government Services
100%	\$ 92.00	\$ 288.06	\$ 224.80	\$ 352.79	\$ 380.06	\$ 316.80
83%	\$ 106.00	\$ 288.06	\$ 224.80	\$ 352.79	\$ 394.06	\$ 330.80
67%	\$ 126.00	\$ 288.06	\$ 224.80	\$ 352.79	\$ 414.06	\$ 350.80
50%	\$ 159.50	\$ 288.06	\$ 224.00	\$ 352.79	\$ 447.56	\$ 383.50
33%	\$ 226.00	\$ 288.06	\$ 224.00	\$ 352.79	\$ 514.06	\$ 450.00

including physical therapy, occupational therapy, recreational therapy and others. The rate also covers medications. However, it does not include diagnostic

testing such as MRI, CT Scan, and many laboratory tests. When patients need these services, they are often taken to NMCSO. Additionally, patients that suffer from hip fractures and other injuries that require follow up by a specialist must also be taken to NMCSO.

According to Dr. Muldoon, NMCSO's sub-specialist in orthopedic surgery for hip fractures and replacements, patients must visit him two or three times per week. Round trip ambulance service costs approximately \$230 per trip (HealthNet Federal Services, Personal Interview). If each hip fracture patient uses two ambulance trips per week, the resulting cost is \$920 per patient for a two-week stay. There were 65 hip patients treated at NMCSO in fiscal year 2000 as shown in table 4. Each would make at least four ambulance trips during an inpatient rehabilitation stay, an on site facility would result in a potential cost avoidance of \$58,880. Only hip fractures can be quantified for ambulance costs. Other patients also utilize ambulance services, and therefore, costs are probably much higher. The databases available do not provide the ability to tie ambulance costs to travel between specific institutions, only the beneficiary.

Quality Review

Determining the quality of patient care provided by acute and sub acute rehabilitation facilities is difficult.

Several problems were discovered during a recent review of institutional rehabilitation records conducted by the Office of the Lead Agent for Region 9. According to Kris Large, Program Manager of the TRICARE Senior Prime Utilization Management Department, variances exist among TSP regions for Acute Rehabilitation Utilization. Region 9 has higher utilization and cost when compared to the other regions. NMCSO also has higher utilization when benchmarked with Milliman and Robertson (M&R) data. Therefore, the Lead Agent decided to hire an auditor to review the records of acute rehabilitation patients.

The consulting group KePro Inc. was hired to assess records for appropriate utilization, coding and quality. KePro selected 53 cases for review, however only 36 cases were available. The other 17 records could not be found. These records included 16 acute rehabilitation, 17 sub acute rehabilitation and three SNF admissions at two facilities, Continental Rehabilitation Hospital and San Diego Rehabilitation Institution (SDRI). Twenty-seven reviews involved SDRI and nine involved Continental Rehab.

Of the 36 cases, four had potential quality concerns and 11 had concerns overall. Poor documentation was a concern in three cases, and length of stay was a concern in one case. In 50 percent of the cases, treatment goals were not met. Six patients (16.7 percent) had to be readmitted to the acute care setting because of medical conditions. It is not known if these admissions were scheduled or unscheduled. Fifty percent of cases were discharged to home, and 17 cases required peer review (49 percent) to determine the quality and efficiency of services ordered and performed.

The reviewers concluded that two cases should have gone to SNFs instead of acute rehabilitation. One of those should have gone to a sub acute SNF and the other to a basic SNF bed. In one case, the patient should have remained in the acute care hospital (NMCSD) instead of acute rehabilitation.

M&R criteria for the Southern California Region suggest that NMCSD is over utilizing acute rehabilitation and under utilizing sub acute rehabilitation and home health services. Each of these findings is discussed in turn.

M&R criteria for the over 65 population suggests that a well-managed organization should utilize only 6.6 occupied acute rehabilitation bed days/1000/year. A loosely

managed organization utilizes 62.1 occupied bed days/1000/year. Therefore, NMCS D's TSP population should only utilize between 32 and 299 bed days/year for the current population of 4800 TSP members. NMCS D utilized 1619 total bed days in 1999 and 2975 total bed days in 2000. Utilization in 2000 was ten times the rate that M&R criteria suggest is appropriate for a loosely managed organization. It is 100 times greater than the suggested rate for a well-managed population. The findings are similar for actual admission rates. Here, M&R well-managed rates are .7 admissions/1000/year and loosely managed rates are 4.5 admissions/1000/year for the over 65 population. NMCS D is averaging over 10 admissions per month.

Skilled Nursing/sub acute rehabilitation utilization is averaging 287-bed days/1000/month. M&R suggest that a well-managed organization uses 728-bed days/1000/year, and a loosely managed organization uses 1395-bed days/1000/year. Therefore, NMCS D's TSP population should utilize between 3494 and 6697 bed days/year. NMCS D utilized 3551 bed days in 2000. This is consistent with a well-managed organization. However, the high acute rehabilitation utilization suggests that NMCS D should be using more sub acute rehabilitation for its TSP population. This suggests that patients are being placed in a higher

level of care then necessary. To quantify this, if NMCS D successfully lowers ARF utilization down to 60 beds per thousand, then it could save over \$300,000 in one year. This is based on a conservative estimate where patients use SNF Sub Acute beds as an alternative, and save approximately \$300 per bed day.

Table 22. NMCS D Utilization Estimates Using Milliman & Robertson Criteria for Loosely and Well Managed Populations

LOOSELY MANAGED POPULATION

Annual Expected Admissions and Costs for Skilled Nursing Facilities (Milliman & Robertson, Inc.) for NMCS D's Adult Population

Age Cat.	Total	Annual Admissions (Expected)	Bed Days	Cost at \$450 per day	Cost per Member
18-24	41,447	12.45	58.52	\$ 26,332	\$ 0.64
25-34	35,884	10.77	50.60	\$ 22,768	\$ 0.63
35-44	31,294	9.39	44.12	\$ 19,856	\$ 0.63
45-64	46,015	13.80	64.88	\$ 29,197	\$ 0.63
65-Above	37,055	1579.9	51,699.14	\$ 23,264,611	\$ 627.84
Total:				\$ 23,362,764	\$ 121.87

WELL MANAGED POPULATION

Annual Expected Admissions and Costs for Skilled Nursing Facilities (Milliman & Robertson, Inc.) for NMCS D's Adult Population

Age Cat.	Total	Annual Admissions (Expected)	Bed Days	Cost at \$450 per day	Cost per Member
18-24	41,447	37.30	335.72	\$ 151,074	\$ 3.65
25-34	35,884	32.30	290.66	\$ 130,797	\$ 3.65
35-44	31,294	28.16	253.48	\$ 114,067	\$ 3.65
45-64	46,015	41.41	372.72	\$ 167,725	\$ 3.65
65-Above	37,055	2072	26,976.04	\$ 12,139,218	\$ 327.60
Total:				\$ 12,702,881	\$ 66.27

LOOSELY MANAGED POPULATION

**Annual Expected Admissions and Costs for Acute Rehabilitation Facilities
(Milliman & Robertson, Inc.) for NMCS D's Adult Population**

Age Cat.	Total	Annual Admissions (Expected)	Bed Days	Cost at \$900 per day	Cost per Member
18-24	41,447	8.30	107.76	\$ 96,986	\$ 2.34
25-34	35,884	7.18	93.30	\$ 83,969	\$ 2.34
35-44	31,294	6.26	81.36	\$ 73,228	\$ 2.34
45-64	46,015	9.20	119.64	\$ 107,677	\$ 2.34
65-Above	37,055	166.50	2,301.12	\$ 2,071,004	\$ 55.89
Total:				\$ 2,432,864	\$ 12.69

WELL MANAGED POPULATION

**Annual Expected Admissions and Costs for Acute Rehabilitation Facilities
(Milliman & Robertson, Inc.) for NMCS D's Adult Population**

Age Cat.	Total	Annual Admissions (Expected)	Bed Days	Cost at \$900 per day	Cost per Member
18-24	41,447	8.29	66.32	\$ 59,684	\$ 1.44
25-34	35,884	32.30	258.36	\$ 232,528	\$ 6.48
35-44	31,294	28.16	225.32	\$ 202,785	\$ 6.48
45-64	46,015	41.41	331.31	\$ 298,177	\$ 6.48
65-Above	37,055	25.90	244.56	\$ 220,107	\$ 5.94
Total:				\$ 1,013,281	\$ 5.29

Milliman & Robertson also provides benchmarks for the under 65-age group. According to them, a well-managed under 65 population should require nine days/1,000 members/year and a loosely managed population utilizes 4.7 days/1,000 members/year for Sub acute rehabilitation in a SNF. Additionally, this population should only utilize 1.6 - 2.6 acute rehabilitation bed days per thousand. This

information suggests that sub acute rehabilitation care services for this age group are under utilized.

Table 22 applies M&R criteria to the NMCSD population and consists of cost projections for acute rehabilitation and SNF/Sub acute rehabilitation for both loosely and well-managed populations. As the table indicates, well-managed populations utilize less acute rehabilitation, and more sub-acute rehabilitation provided in SNFs. Generally, according to M&R Criteria, the higher the cost, the less a service should be utilized. The reader should keep in mind that M&R criteria do not address quality, or the way that institutions report utilization. For instance, some hospitals have their own acute rehabilitation units, and they might report utilization as a step down bed, or by another name other than an acute rehabilitation bed. Table 22 addresses bed day utilization, cost per member, and total cost for NMCSD's population as provided by the Managed Care Forecasting and Analysis System. It provides estimated costs for all potential beneficiaries including all persons over age 65. As of May 2001 NMCSD is only responsible for an over 65 population of 4800 beneficiaries.

Table 23 is an estimate of what costs should be for a TSP population of 5000. It shows that acute rehabilitation

and sub acute rehabilitation costs should be much lower for both a well managed and a loosely managed population. The cost for a loosely managed population is \$1.6 million more than the cost for a well-managed population. Both cost projections are significantly lower than what NMCS is currently spending. Therefore, one could conclude that better utilization management could reap a significant cost avoidance.

Table 23. TSP Cost Projections Using M&R Criteria

Tricare Senior Prime Cost Projections (Using M&R Criteria) for 5000 Beneficiaries for Acute and Sub acute Rehabilitation				
INSTITUTION	MANAGEMENT	ADMISSIONS	BED DAYS	ANNUAL COST
SNF/Sub Acute	Loose	213.5	6975	\$ 3,138,750
	Well	280	3975	\$ 1,788,750
Acute Rehabilitation	Loose	22.5	310.5	\$ 279,450
	Well	3.5	23.1	\$ 20,790.00
Expected Cost Loosely Managed Pop:				\$ 3,418,200
Expected Cost Well Managed Pop:				\$ 1,809,540
Difference:				\$ 1,608,660

The KePro audit also brings several questions to the forefront including:

1. Are processes in place to determine the most clinically effective level of rehabilitation in which patients should be placed?
2. Why are 50 percent of patients unable to meet their rehabilitation goals?

3. Is more oversight needed, including concurrent review of treatment plans, length of stay, and clinical outcomes?
4. Are attending physicians adequately involved in the discharge process for patients that go to rehabilitation institutions?
5. Are other costs factored into rehabilitation claims that do not appear in the claims associated with other TSP locations?

Many of the above questions should be the focus of future studies. However, it is clear that Region 9 is probably over utilizing acute rehabilitation institutions and does not know if good outcomes are being achieved. The fact that 18 patients did not reach treatment goals, six patients were re-admitted to acute care, and 12 patients could not meet goals because of limited stamina makes quality and placement in the proper setting suspect. Again, it appears that NMCSD is not adequately assessing patient's needs. Therefore, the following question should be asked: Does acute rehabilitation work?

As discussed during the literature review, variation in outcomes still occurs in healthcare. The major goal should be to reduce practice variation and improve overall outcomes. However, because of the proprietary nature of

business, many providers and institutions do not openly share the clinical practice guidelines and other tools that they research and design in order to maintain a competitive edge (Meisenheimer, 1997). In the case of rehabilitation institutions, this involves their various forms of functional independence measures (FIMS). Although most use FIMS, they do not always share information with payers. The result is that payers do not always know if they are getting value from institutional providers. Currently, NMCSO has no proactive mechanism in place to measure the quality of inpatient rehabilitation provided by its contracted network institutions. The KeyPro audit represents a start. In order to improve further, healthcare providers must begin collaborating across institutional and organizational lines, working as a team to improve continuity of care and outcomes. The result should be better quality and lower cost (Meisenheimer, 1997).

As discussed earlier, HCFA has a new assessment instrument designed to provide a minimum data set to measure patient outcomes. Perhaps NMCSO should start using this tool to assess patients before making decisions about where they should be placed. NMCSO should then request the FIM results of patients when they are discharged from ARFs and SNFs in order to measure outcomes.

Before NMCSO begins to measure FIMs, personnel should be trained in their proper use, and to understand the phenomenon of heuristics as discussed in a study published in the Archives of Physical Medicine and Rehabilitation in December 1998.

This study evaluated 50 rehabilitation professionals to determine their accuracy in assessing FIMs. It concluded that bias and poor judgment of level accuracy affect the ratings clinicians give to patients when evaluating their various levels of function. The findings suggested that clinical judgment is often highly subjective and that raters use short cuts in assessing patients based on experience. This means that clinicians will often substitute the evaluation of an independent patient by his experience with other patients with similar characteristics such as age, illness, socioeconomic status, etc. The study also compared clinician's perceived competence level with actual results. It found that clinicians were influenced by the ratings that other clinicians had already given a patient. This means that when a patient had high FIM scores in his record, the clinicians under the study tended to give the patient a high FIM score. The same was found to be true for low FIM scores.

The other significant finding was that clinicians were overconfident in their abilities. The average accuracy in FIM ratings among psychologists, nurses, physical therapists, occupational therapists, and speech therapists were measured. Their actual confidence levels ranged from 68-78 percent when compared to their "perceived confidence" of 83-90 percent. Therefore, clinicians often overestimate their ability to measure their patient's abilities. Of the professions mentioned above, occupational therapists performed the worst, and physical therapists performed the best. The result is that patients might sometimes be placed into the wrong level of care. Therefore, clinicians need to be trained to eliminate bias, and to not take short cuts when evaluating their patients. This is important because Medicare's new payment system will financially reward facilities for good outcomes. It is also important because personnel at NMCSO must be aware that network facilities are not always accurate in their assessments, and therefore NMCSO providers must be diligent in following up their patients (Wolfsan, A, Doctor, J, Burns, S, 2000).

The study mentioned earlier in the literature review perhaps addresses the above issue. The Berg Balance Scale used to predict the average length of stay and the discharge outcome for patients that undergo rehabilitation

for acute stroke appears to be an accurate tool. This test was found to be simple to administer using a ruler and stopwatch. Because measurement standards are objective, intra-rater and inter-rater reliability were found to be excellent at .97 and .98 respectively.

The inclusion of BBS and other variables may help clinicians and case managers when determining the proper placement of patients into rehabilitation settings. Family support is one variable that should be considered. Again only 22 percent of patients that lacked family support were discharged to home while over 85 percent of patients with family support were discharged to home, even though many had lower BBS scores and higher disability levels when they were discharged.

The Rehabilitation Institute of Chicago is currently conducting research to establish if there is a clear relationship between therapy and functional outcome. Specifically, it is attempting to determine the type, intensity, and duration of rehabilitation required to achieve certain functional outcomes. It is also evaluating the differences between patients with various types of disability in functional outcomes, the extent and rate of improvement in outcomes, and

the characteristics of improvement during inpatient rehabilitation. This research is on going and has not been completed yet. Therefore, no conclusions can be made (Heinemann, Hamilton, Johnston, Ongoing).

It may be beneficial for NMCS D to conduct inpatient rehabilitation on site to gain control of the patient's care, accurately measure outcomes, and provide the appropriate level of care. One of the initial goals of this project was to determine if inpatient rehabilitation would improve the rate and speed at which injured personnel return to duty. Current data does not allow for a proper analysis of this question. However, it might be an appropriate subject for future studies if a database could be developed. The database should capture treatment variables for each patient including therapeutic interventions, medical treatments, and functional improvement over time. Outcome variables should include patient dispositions such as permanent disability, limited duty time, time in medical hold, and others.

Limited Duty Population

Between 1985 and 1995, between 1-2 percent of the Navy's active duty enlisted force was in a limited duty status (LIMDU). This means that these members are not fit for full duty. Therefore, they cannot go to sea and fulfill

their primary duty as a sailor. The total number of personnel on temporary limited duty in 1995 was 5,368. The average LIMDU period was between 8-10 months. The approximate cost in today's dollars, assuming the average pay grade is E-4, would be \$159 million (based on 2001, DOD Annual Composite Rates) for 4473 man-years at \$35,764 per year. The split between males and females was nearly equal. In July 1996, 881 were females and 882 were males. The rate of LIMDU status for women dramatically increased when women became eligible for duty at sea.

In 1995, the primary reason that sailors were on limited duty was orthopedic injury. Approximately 16 percent were for bad knees, and 8 percent were for bad backs. Other orthopedic causes made up 31 percent of the LIMDU population. Cardiopulmonary disease and psychological problems/illness each were responsible for 5 percent of the LIMDU Population. This research finding is interesting because rehabilitation programs should be able to have some impact on improving orthopedic patient outcomes. Additionally, overweight personnel are 2.5 times more likely to be affected by medical conditions that result in a sailor's placement into LIMDU status (Keenan, D., Wilkins, G., 1998). According to CDR Keenan and Gail Wilkins, in their research concerning the Navy's Disability

Evaluation System, there may be a disincentive for service members to get better and return to duty. During a sailor's time on LIMDU, he is still eligible for advancement and can apply for training programs while being precluded from sea duty. Secondly, if the member is referred to a Physical Evaluation Board (PEB), he may be found disabled, which can result in discharge from the Navy with a monthly stipend depending on the extent/percentage of disability. The other result could be that the member is found fit for duty, but limited to shore duty (Keenan, D., Wilkins, G., 1998).

In 1996, NMCS D processed over 2,198 PEBs and an unknown amount of LIMDU boards. However, 5,368 sailors were in LIMDU status Navy wide. Table 24 is a summary of admissions and discharges for NMCS D's Medical Holding Company (MHC).

Table 24. NMCS D Medical Holding Company Admissions January 2000 – March 2001

NMCS D MEDICAL HOLDING COMPANY ADMISSIONS				
PERCENT	SPECIALTY	PATIENTS	DISCHARGE DESTINATION	NUMBER
8%	Cardiology	15		
33%	Orthopedics	65	Temp Personnel Unit	61
11%	Neurology	22	Parent Command	31
14%	Psychiatry	28	Inpatient	3
33%	Other	65	Other	9
Total Patients: 195			Total Discharges: 104	

The MHC is provided for active duty patients that are well enough to stay outside of the inpatient hospital environment, but cannot return to duty because of the hazardous environments associated with their duty station. These MHC patients have illnesses that preclude them from walking up and down ladders and other activities associated with ships. Additionally, the ship may not have medical personnel and equipment to care for the patient adequately. The data shows that 33 percent of admissions to MHC were for orthopedic conditions, 14 percent were psychiatric patients, and 11 percent were neurology patients. Perhaps the orthopedic and neurology patients can benefit from inpatient rehabilitation. The average length of stay in MHC is 121 days for those patients admitted with orders, 32 days for those temporarily assigned to duty, and 16 days for those sent for workups, but expected to return to duty. The average number of patients (daily census) throughout 2000 and the first quarter of calendar year 2001 were 48 with a range of 45-50.

Outcomes for these patients were not available. Of 104 patients discharged from the MHC, 61 went to the Temporary Personnel Unit. The TPU is for sailors awaiting transfer to ships at sea, awaiting orders, and those waiting for Medical Board Processing. TPU is also used for

sailors awaiting legal proceedings and other determinations. However, the data does not say what happens to patients after they go to their next assignment. It does say that four patients were admitted to the hospital. These four patients consisted of one oncology patient, one psychiatric patient, one ear nose and throat patient, and one orthopedic patient. The result of these admissions is unknown.

MHC Leadership is currently maintaining a simple Microsoft Excel File to track patients. Perhaps a database can be created using Microsoft Access and the information mentioned above could be captured.

Hypotheses Test Results

H1: Current rehabilitation facility utilization does not justify the provision of inpatient rehabilitation at NMCSO. In this case, providing inpatient rehabilitation at NMCSO would be cost effective and the Null Hypothesis should be rejected. NMCSO would reap a significant cost savings ranging from \$1-\$3 Million. Additionally, a newly constructed stand alone facility could also save the navy money if it is properly structured, and facilities could be constructed on land already owned by the government.

H2: The costs associated with physician fees, ancillary services, ambulance services and other services not provided by NMCSO do not justify direct care at NMCSO. Physician fees were not available, however, a physician is required to see each patient on at least a weekly basis. This cost is billed separately. It was also concluded that NMCSO could save \$58,880/year or more in ambulance transport fees alone just for patients that undergo hip surgery. Therefore, providing on site rehabilitation and skilled nursing can significantly reduce physician fees, ancillary costs, ambulance costs, and others. Additionally, continuity of care might be improved.

H3: The current system provides for adequate access to skilled nursing and rehabilitation care. The research indicates that acute inpatient rehabilitation services were over-utilized in 1999 and 2000. Additionally, sub acute SNF rehabilitation and home health care are under utilized. Therefore, the null hypothesis cannot be rejected. However, it is very evident that utilization needs to be better managed.

H4: The current system provides quality outcomes for patients when considering return to work, and length of stay in the hospital. The alternate hypothesis was that inpatient rehabilitation at NMCSO would allow patients to

return to work faster and result in shorter lengths of stay in the acute care setting. In this case, the null hypothesis cannot be rejected. However, it appears that there are quality issues with the current system. Both utilization and outcomes are questionable.

Conclusions

Based upon the data, and other qualitative information, the following conclusions could be made:

- Acute and sub acute rehabilitation are not appropriately utilized when benchmarking against Milliman and Robertson Criteria for Southern California. Better utilization management practices can result in a significant cost savings. Perhaps as much as \$300,000 or more per year.
- Outcomes information for all beneficiaries is insufficient, and therefore it cannot be determined if patients are benefiting from the rehabilitation services they receive. The KeyPro study discussed earlier suggests that many patients are returning to the acute care setting, and only 50 percent of patients are returning to their homes.
- Appropriate utilization of services is paramount in a managed care environment. Perhaps if patients are kept at NMCS D in a rehabilitation unit, their overall

care can be better managed, outcomes could be more appropriately measured, and the Navy could gain additional knowledge concerning the broad field of inpatient rehabilitation.

DISCUSSION

The following discussion is intended to provide the reader with a broadened perspective regarding the complexities of inpatient acute and sub acute rehabilitation. It is based on extensive research as well as an analysis of the current process and consultation with several technical experts.

THE CURRENT SYSTEM

A recent assessment of the nine TRICARE Senior Prime (TSP) program sites evaluated the utilization of various health services by beneficiaries. It determined that for every 100 beneficiaries, 2.7 were admitted to SNFs in 1998 and 3.0 were admitted to SNFs in 1999 at two non-TSP control sites.

The two TSP sites had SNF admission rates of 2.4 per 100 in 1998 and 2.1 per 100 in 1999. The study does not distinguish between acute rehabilitation and sub acute rehabilitation facilities. Utilization of home health, hospice and long-term facilities was also reduced for the

TSP sites. However, during the same years, the study showed that TSP inpatient acute hospital utilization increased from 8.6 admissions per 100 to 9.5. Inpatient days at TSP sites increased from 39.6 days per hundred to 46.4 days, a seven-day increase in utilization.

The overall finding of the study was that TSP patients utilized services not provided at MTFs much less than those potential beneficiaries that used the standard Medicare fee-for-service system. This suggests that patients are kept in the acute inpatient setting longer when they possibly should be discharged to a lower level of care. It might be possible that MTF Commanders and Lead Agents want to reduce network costs.

This analysis of the current system primarily resulted in a finding that costs could be avoided by conducting acute and sub acute rehabilitation at NMCS and at a jointly operated Navy/DVA facility. According to Sun Tzu's, "The Art of War":

As water shapes its flow in accordance with the ground, so an army manages its victory in accordance with the situation of the enemy. And, as water has no constant form, there are in war no constant conditions.

The above statement is also true of the healthcare industry. Internal and external conditions are never constant. Recently, the federal governments legislators approved TRICARE for Life. Because of this new program, the TRICARE Senior Prime program has met its end. Even so, TSP members will now be allowed to utilize civilian services with no out of pocket cost. Retired military personnel over the age of 65 will now be able to go anywhere they want for their healthcare. NMCSO will still be available to current TSP beneficiaries and others on a space available basis. However, NMCSO's overall financial responsibility for the TSP population will go away.

TRICARE for life will now be responsible for paying the cost difference for health services that Medicare does not cover or pay. In essence, benefits that are covered by TRICARE, but not by Medicare will be covered. Additionally, TRICARE will pay the difference for care that Medicare does not cover. This means that having inpatient rehabilitation services solely to avoid costs is probably not feasible because Region 9 will no longer be required to cover the total cost of acute and sub acute rehabilitation for patients over age 65. The remaining population of beneficiaries also utilizes inpatient rehabilitation facilities.

Table 25. NMCS D Discharges to ARFs and SNFs

NMCS D Discharges Under 65 (1 October 1998 - 30 September 1999)						
Age	Admissions	IRF	SNF	Cost	Days	Cost/Day
18-24	3	0	3	\$ 40,456.00	43	\$ 940.84
25-34	1	0	1	\$ 7,992.00	34	\$ 235.06
35-44	3	2	1	\$ 37,211.00	19	\$1,958.47
45-54	7	5	2	\$ 53,617.00	55	\$ 974.85
55-64	38	17	21	\$209,144.00	539	\$ 388.02
Totals	52	24	28	\$348,420.00	690	\$ 504.96

Source: CHCS Ad Hoc Report

Table 25 shows that for selected Diagnosis Related Groups, that 52 patients were discharged from NMCS D to ARFs and sub acute rehabilitation facilities. These 52 patients out of a database of 703 cost an average of \$504 per day. Additionally, the group that used the most services was those ages 55-64. This population represents nearly 49,000 beneficiaries. Therefore, it may be prudent to track their utilization of services more carefully. The active duty population was found to use very little inpatient rehabilitation care. When they do, it is generally for serious trauma that results in spinal cord and head injury. The DVA and others that are equipped with proper facilities and personnel that can assist the patient with the often-permanent transition to life in a wheel chair more appropriately provide these services. As discussed

earlier, it is difficult to determine if other active duty personnel that are on LIMDU status could benefit from inpatient rehabilitation.

The average length of time an active duty sailor stays in a limited duty status is over six months and often longer. A sailor can remain on limited duty for up to two years. Perhaps an inpatient rehabilitation unit, designed on a smaller scale would benefit those sailors and the Navy by facilitating a more rapid return to duty. Maybe intensive therapy with around the clock supervision would be more motivating to sailors. Again, 33 percent are afflicted with orthopedic injuries that may improve with intensive physical therapy.

Another issue is the current external healthcare environment. The regulatory environment, as well as high energy costs and labor shortages are squeezing California hospital's profit margins. Additionally, payers are not covering costs. Eventually, economic law dictates that those that continue to lose money will ultimately have to shut their doors. Those that survive will ultimately have to charge more for their services. It is likely that healthcare costs in San Diego will begin rising more rapidly. This is due to the rapidly rising cost of doing business. For instance, electricity prices at one of San

Diego's ARFs have tripled from \$20,000 to nearly \$60,000 dollars per month. This results in an additional cost of \$22 per bed day with an average census of 60 inpatients. Although \$22 does not sound like much, this is a lot for a for profit corporation whose parent company has claimed bankruptcy. From a payer standpoint, in the case of NMCS D, this extra \$22 in cost, if added to the bills, would result in additional \$126,000 for the 5728 bed days used in 2000. This represents enough money to hire 2-4 nurses depending on their experience level. Other forces will also increase healthcare costs. These forces were discussed extensively in the introduction.

Cost Effectiveness Vs. Cost Benefit

The other question that must be asked is; what would the non-monetary benefits of providing Inpatient rehabilitation at NMCS D be. This paper primarily focuses on the feasibility of inpatient rehabilitation from a dollar-cost standpoint. This is because of the lack of solid outcomes data both in the literature and in the data provided by the MHS's database system. A cost benefit analysis (CBA) considers opportunity costs and translates them into dollars. In the case of this study, opportunity costs would be those costs that are avoided by doing

inpatient rehabilitation at NMCSO (Getzen, 1997). NMCSO may be forgoing the following opportunities:

- The opportunity to study rehabilitation outcomes in a controlled environment
- To reduce the amount of lost work days for sailors
- To reduce the degree of disability in patients
- To improve the health of some sailors adequately enough to return them to full duty when the current system would not
- To become more proficient by learning the kinds of therapeutic interventions that work and those that do not work

Thus, the dollar value of the opportunities listed above is unknown. Therefore, this study primarily consists of a Cost Effectiveness Analysis (CEA). A CEA is a form of CBA that does not translate benefits such as the days of lost work saved, or the level of function a patient gains from rehabilitation, or other benefits into dollars (Getzen, 1997).

Another economic theory to consider is the phenomenon called "moral hazard". Moral hazard is the change that occurs in individual behavior because of changes in

insurance coverage (Getzen, 1997). The new TRICARE benefits package that was instituted in April 2001 may result in a change in MHS beneficiary behavior. First, co-payments have been eliminated for active duty family members. They can now go to TRICARE network providers without the requirement to pay a \$12 fee. It is too early to determine the effect of the new benefit, however, if a substantial number of active duty beneficiaries leave the direct care network, then only retirees and their family members will remain. Retirees and their family members must still pay co-payments when using network providers. If additional space opens up because active duty families leave the direct care system, it may be filled by retirees and their families.

As shown in Table 25, retirees use more ARF and SNF services. Additionally, during interviews with executives at HealthNet Federal Healthcare Services it was learned that many retirees, including themselves are forgoing insurance provided by the companies for which they now work. This is because TRICARE provides a rich benefit with very little out of pocket cost. Additionally, when retirees forgo their employer's health benefits, they can often choose another benefit in its place. Therefore, the mix of beneficiaries that utilizes direct care at NMCS and its

clinics may change, and utilization of services may increase because of the older retiree population.

RECOMMENDATIONS

NMCSO should not consider offering inpatient rehabilitation at this time. Because of the changing healthcare benefit, particularly the loss of total fiscal responsibility for TSP beneficiaries, the loss in volume would preclude the allocation of resources. NMCSO should however, monitor the change in utilization of acute and sub acute rehabilitation caused by the loss of TSP patients. Additionally, TRICARE should continue to monitor the overall cost of SNF/sub acute rehabilitation and ARF care among all beneficiaries including those over 65. Since TRICARE will continue to pay costs for ARF and SNF care not covered by Medicare, the possibility of cost avoidance may still be present. When Medicare patients use up their benefit, TRICARE will still be responsible for paying the cost of appropriate care above what Medicare covers.

Outcomes should be carefully tracked among all populations using a measurement instrument such as the Medicare MDS data set. This includes the active duty population. We need to know the outcomes of those personnel that are placed in a limited duty status and into the MHC. The MHS should determine if an inpatient rehabilitation

unit would result in better outcomes for active duty personnel. Our readiness mission suggests that we should be making every attempt to return these patients to duty as quickly as possible. Therefore, it could be beneficial to create an inpatient step down rehabilitation unit.

Another opportunity exists to examine the feasibility of creating a home care system at NMCSD. All beneficiaries at NMCSD utilize home care. Milliman and Robertson indicate that NMCSD's 154,640 beneficiaries under the age of 65 should use between 30 and 81 units of home care/1000/year. Therefore, NMCSD should be utilizing between 4620 units as a loosely managed organization to 12,474 units as a well-managed organization at a cost of \$70-\$140 per unit. Current utilization rates and costs are not available at this time. However, when dividing the above figures by 365 days, NMCSD could provide 13 to 34 home visit units per day. Therefore, the subject of home care is an excellent topic for future research.

Finally, Harriet S. Gill and Michael Rovinsky of Gill/Balsano Consulting LLC, in 1998 suggested that current reimbursement mechanisms should entice health systems to develop post acute care settings, but not necessarily act as the provider. They conclude that many systems claim to be integrated systems, but most are not. They suggest that

many systems should consider integrating at each step across the continuum of care. This is because care settings that are assumed less costly, such as home care, may be more costly because of higher utilization. Integrating the levels of care to control all aspects of patient flow will result in an optimized system of health care (Gill, Rovinsky, 1998).

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Appendix

<u>LENGTH OF STAY STATISTICS</u>				
ALOS	6	Avg. Deviation	5	
LOS	# OF PTS	TOT. DAYS	LOS+Avg. Dev.	Gain/loss
1	204	204	7.40	-1305.6
2	112	224	7.40	-604.8
3	74	222	7.40	-325.6
4	98	392	7.40	-333.2
5	66	33	7.40	-158.4
6	43	258	7.40	-60.2
7	28	196	7.40	-11.2
8	20	160	7.40	12
9	8	72	7.40	12.8
10	13	130	7.40	33.8
11	10	110	7.40	36
12	5	60	7.40	23
13	8	104	7.40	44.8
14	6	84	7.40	39.6
15	4	60	7.40	30.4
16	5	80	7.40	43
17	1	17	7.40	9.6
18	3	54	7.40	31.8
19	1	19	7.40	11.6
20	1	20	7.40	12.6
22	3	66	7.40	43.8
23	1	23	7.40	15.6
24	2	48	7.40	33.2
25	1	25	7.40	17.6
26	1	26	7.40	18.6
27	1	27	7.40	19.6
29	1	29	7.40	21.6
30	1	30	7.40	22.6
32	1	32	7.40	24.6
38	1	38	7.40	30.6
42	1	42	7.40	34.6
47	2	94	7.40	79.2

55	1	55	7.40	47.6
74	1	74	7.40	66.6
75	1	75	7.40	67.6
86	1	86	7.40	78.6
<u>Check</u>	730	3566	Total Days Lost:	<u>963</u>
			Total Patients:	105
			Days per PT:	<u>9.2</u>
			Days Saved:	<u>2787.8</u>
			Total Patients:	597
			Days per PT:	<u>-4.7</u>